

REPORT

OF THE

FRUIT GROWERS' ASSOCIATION

OF THE

PROVINCE OF ONTARIO,

FOR THE YEAR 1872;

TO WHICH IS APPENDED THE

Report of the Entomological Society,

FOR THE YEAR 1872.

Printed by Order of the Legislative Assembly.



Toronto:

PRINTED BY HUNTER, ROSE & CO., 86 & 88 KING STREET WEST.
1873.

Montreal Horticultural Society

AND


Fruit Growers Association of the Province of Quebec.

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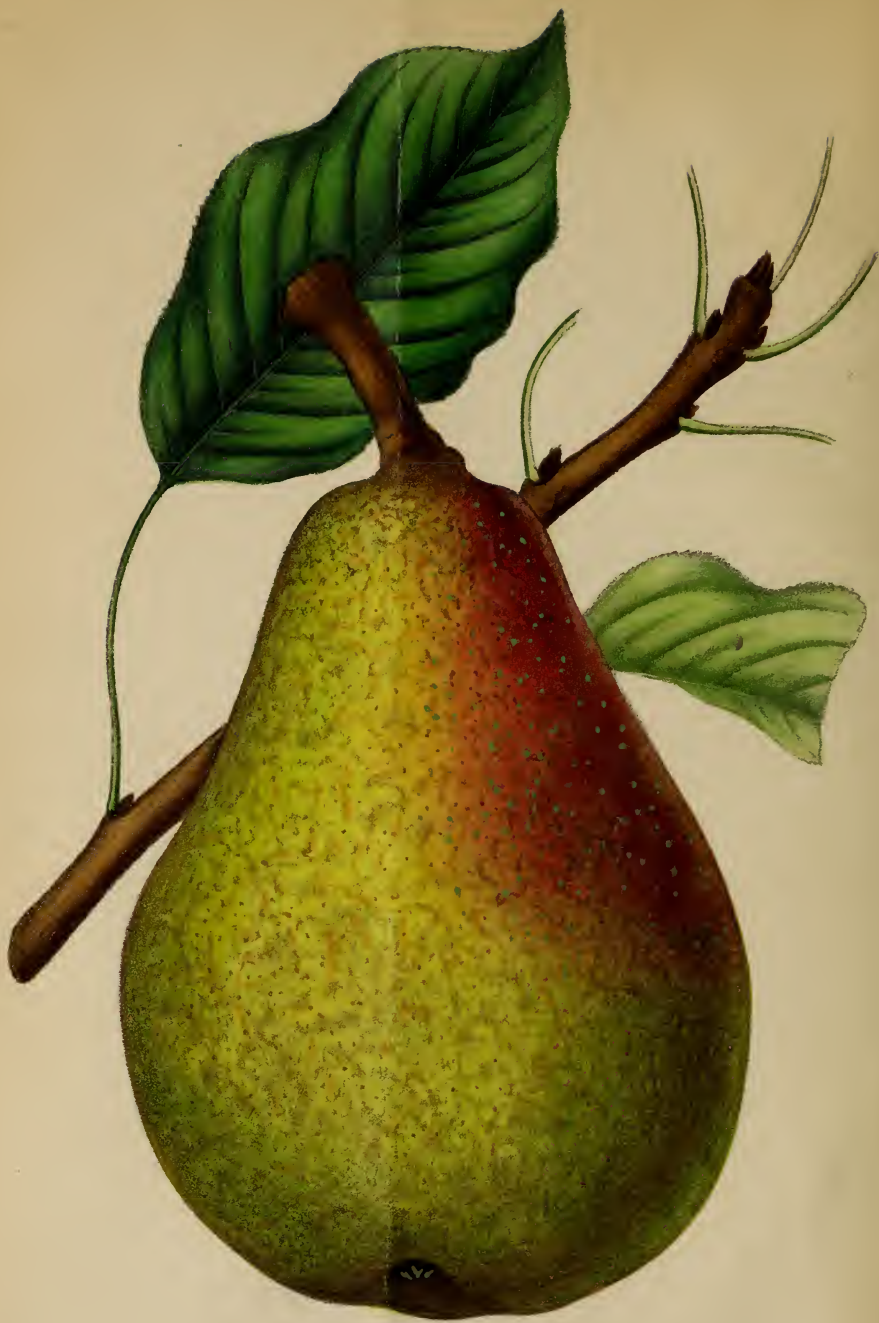
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THE BEURRE CLAIRGEAU PEAR.

Lith & col. by Amana Society, Homestead, Iowa.

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REPORT

OF THE

Fruit Growers' Association

OF ONTARIO

FOR 1872.

To the Honourable the Commissioner of Agriculture :—

SIR,—It is with much pleasure that I submit for your inspection the Report of the Fruit Growers' Association of Ontario for the year 1872. Since the presentation of our last Report the membership of the Association has largely increased, having more than doubled in number, and these so widely scattered over the Province that nearly every section is now represented. The Directors, believing that it would very materially promote the objects which this Association is intended to advance, if the members were put in possession of a complete list of the names and post-office address of their several co-labourers, have instructed me to embody in this Report such a list, so arranged under the head of the several counties and cities as to enable them readily to ascertain who among their neighbours are members of the Association. The Report also contains the usual record of the discussions which took place at the February, July and October meetings, which contain much valuable information—the annual address of the President, which will prove of very great value to every one interested in the growing of pears, &c., and such other papers of interest as the Directors have been able to procure. A beautifully executed lithograph of the Bonne Clairgeau Pear, accurately coloured by hand, has been secured to accompany each number of the Report, designed for the members of the Association. It is the intention to continue to illustrate the Annual Report in this manner, if the means of the Association will admit, in the hope of ultimately furnishing the members with accurate coloured representations of our most valued fruits.

I have the honour to remain,

Your obedient servant.

D. W. BEADLE,

Secretary of the Fruit Growers' Association.

ST. CATHARINES, Nov. 1st., 1872.

PROCEEDINGS AT THE ANNUAL MEETING

The annual meeting was held in the Court House, Hamilton, on Tuesday evening, September 24th, 1872.

The meeting was called to order by the President.

The Secretary read the Directors' report, which was received and adopted.

The Treasurer submitted his report, together with the certificate of the Auditors.

The President read his annual address, which was received with marked attention and interest. On motion of Mr. Ross, of Goderich, seconded by Mr. Saunders, of London, the thanks of the meeting were tendered to the President, and he was requested to furnish a copy for the committee on publication.

The election of officers for the current year was then held, with the following result:—

President—Rev. R. Burnet, Hamilton.

Vice-President—Wm. Saunders, London.

Secretary-Treasurer—D. W. Beadle, St. Catharines.

Directors—Messrs. J. C. Rykert, St. Catharines; John Gray, sen., and George Leslie, jun., Toronto; W. F. Clarke, Guelph; J. A. Allen, Kingston; A. B. Bennett, Brantford; A. M. Ross, Goderich; C. Arnold, Paris; and W. Holton, Hamilton.

Auditors—Messrs. W. L. Copeland, and W. J. McCalla, St. Catharines.

Some discussion having arisen with regard to the number of Directors, and the importance of having all parts of the Province represented in the Council of the Association, it was on motion,

Resolved, that the President and Secretary, together with Messrs. Rykert, of St. Catharines; Allen, of Kingston; and Gibbons, of Goderich; be a committee to revise the Act of Incorporation of this Association, and take such action in relation to the alteration of the same by the Legislative Assembly as they may deem to be advisable.

Some seedling fruits were laid on the table by Messrs. Morse, Moyle, Arnold, and Cowherd, which were duly referred to the committee on seedling fruits.

Mr. Roy, of Owen Sound, having brought to the meeting some fine samples of Grapes, grown at that place in the open air, the thanks of the Association were voted to Mr. Roy, for taking the pains to bring to this meeting these interesting specimens of the fruits of the Georgian Bay, and in this way helping to diffuse a knowledge of the fruit capabilities of that part of the Province.

On motion, adjourned.

DIRECTORS' REPORT,

Read at the Annual Meeting.

In closing another year, the Directors take great pleasure in announcing the continued increase in the membership of our Association, and the consequent enlargement of its field of operations, and greater usefulness. Our membership is now very nearly two thousand, scattered over all parts of Ontario, and a few residing in the sister Provinces. It has been our intention, as soon as practicable, to publish a new copy of the Constitution and By-laws, with a complete list of membership, for distribution among our members, so that we may all know who they are and where they reside.

Three meetings for discussion of subjects affecting the growing of fruit have been appointed, the first was held at Hamilton, in January; the second at Guelph, in July; and the third to be held in the Board Room, Agricultural Hall, Toronto, on the 8th day of October. A very decided benefit accrues to the Association and extension of its usefulness, by holding these meetings for discussion at different places in the Province, and we trust that in the future pains will be taken to scatter them yet more widely than has hitherto been done.

The system of distributing fruit-bearing trees and plants among the members, so auspiciously begun by our predecessors, has been continued during the past year, and trees of the Wagener Apple, Beurré Clairgeau Pear, McLaughlin Plum, Hales Early Peach, and Othello Grape, were very widely scattered in various parts of the land last spring. Believing that this

method of making the whole Province a great experimental fruit garden to be fraught with the happiest results both to our society and to our country, we have made engagements to have grown a quantity of the Goodale Pear sufficient to supply all of our members with a tree; have engaged two thousand trees of Clapp's Favourite Pear, for distribution next spring, and have advertised for plants of the Downing Gooseberry, to be furnished in the spring of 1874, and trees of the Swayzie Pomme Gris, for spring of 1875, and of the Tetofsky Apple for spring of 1876, with a view to their distribution to the members of the Association. It was the intention of your Directors to have coupled the Norton's Melon Apple tree with the Clapp's Favourite Pear for distribution next spring, but we have been wholly unable to find them in sufficient quantity.

We have followed the course pursued by the board last year, in appointing committees to make a personal inspection of parts of the Province, with a view to ascertain their present fruit productions and their fruit producing capabilities. We appointed committees to examine the country along the Lake Erie shore of Kent and Essex; also, in the County of Huron, and in the vicinity of Toronto, within a radius of fifteen miles, and in the County of Frontenac, about Kingston; and hope that the reports of the committees entrusted with this labour, —which is on their part a labour of love, being without compensation—will be full of much very valuable information.

The prizes offered during the year 1872 will be found upon the 3rd page of the report for 1871. We are sorry to be obliged to say, that no essays have been received by the Secretary in competition for the prizes offered therefor. The committee on seedling fruits have several promising varieties under examination and trial, prominent among these are Mr. Dougall's Cherry, and the Elliott Pear, and we hope that among them some will be found worthy to receive the very liberal prizes offered for Canadian seedlings.

The Report for 1871 was handsomely embellished with a very accurate coloured lithograph of the Red Astracan Apple, which not only added much to the appearance, but also to the usefulness of the Report, by placing before the members a truthful representation of one of our most hardy and most useful fruits. Believing that this feature of our Report should be continued, we have engaged the same artist to prepare two thousand copies of a coloured lithograph of the Beurre Clairgeau Pear, with which to illustrate the Report of 1872.

It seems also very desirable that this Association should possess a few acres of ground upon which fruit-bearing trees and plants, whether of Canadian or foreign origin, may be tested sufficiently to enable the Directors to decide whether they or any of them are of sufficient value to be grown and disseminated for trial throughout the Province. We believe that such an initiative experimental ground is essential to the best accomplishment of the great objects of the Association, and that it should be procured and placed under the supervision of some competent person, amenable to the Directors, at the earliest practicable moment.

In order to accomplish all these ends, it will be necessary to procure an increased Government Grant. The sum of five hundred dollars per annum, now received, is barely sufficient to enable us to accomplish but a small part of the good that this Association is capable of doing in the way of helping our people to those varieties of fruit, and informing them in regard to the methods of cultivation, best suited to our peculiar climate and position. This Association is Provincial, and is supplementing for the whole Province the work of our noble Provincial Agricultural Association, in increasing and improving the products of Canadian industry, and there is no reason why it should not receive from the public funds assistance proportioned to the magnitude of its undertakings. Viewing the matter in this light, the Directors have already authorized the President and Secretary to represent the work of this Association to the Honourable the Commissioner of Agriculture, and to request that he may consider whether the interests of the country would not be largely promoted by giving to this Association, and to our sister Society, the Entomological Association, increased facilities for the prosecution of our work.

Another matter that will claim attention from this Association is the establishment of some standard for the judging of fruits and deciding upon their respective merits. Were some standard of comparison once fixed by this Association that should commend itself to the lovers of fruit, much of the uncertainty that now exists would be removed. Such is our climate and peculiar geographical and geological position, that we need a standard of excellence for ourselves, by which we may measure the quality of our apples, pears, plums, cherries, &c. In the matter of pears for instance: the Flemish Beauty comes the nearest

to perfection, for us, of any variety with which we are acquainted. In size, beauty, flavour and texture of fruit, and in health, vigour, productiveness and hardihood of tree, it is pre-eminently the Canadians' pear. But we do not propose here to discuss this subject, only to commend it to the attention of the members of our Society, and especially of the incoming Board of Directors.

We have also applied of our funds the sum of fifty dollars as a grant to the Entomological Society, in aid of their library. This we have done because we have felt that the labours of this society, as embodied in their reports, which have been appended to our own and distributed to all the members of our Society, are largely for the benefit of ourselves, and that some acknowledgement on our part of the services rendered by that Society, in the interests of fruit growers, was both due to them and just in us. Besides, we remember that whatever should increase the facilities of our sister society for the prosecution of her peculiar work would only enable her the more efficiently to serve the interests of our own, and that such an expression of the appreciation in which we held her services would serve to strengthen the mutual good-will and esteem that has always subsisted between us.

It will be seen by our Treasurer's Report, that we have fully used all the funds which have been placed under our control during our term of office. We trust that the manner in which they have been expended will meet with your approbation. By far the largest item of expense is that connected with the distribution of trees. We look forward to such an increase in our membership as will eventually lessen the proportionate cost of this branch of our expenditure, while, at the same time, the aggregate amount shall be largely increased. During the past season we distributed to the members, 542 apple trees, 348 peach, 1115 pear, 819 plum, 600 grape-vines and 31 raspberry and blackberry plants. In addition, our members have received a valuable report, embodying information worth many times the amount of their annual fee; a report that is sought after by kindred societies abroad, and from which liberal extracts are made by the leading horticultural periodicals of Great Britain. And we believe that when the cost of carrying on the operations of this Association is compared with the amount expended for the direct benefit of its members, it will be seen that your Directors have not been wanting in their regard for the most economical discharge of the trust committed to them.

The plan, adopted by our predecessors and continued by us, of rewarding those members who, at some cost of time and inconvenience to themselves, have taken pains to represent to their neighbours the operations of our Society and the benefits to be derived from joining it, has been found to work well. We would suggest that some special award might be made to those who added fifteen or twenty new members to the Association in one season, believing that such would be a step in the right direction. We have also had inquiry from some, if they might be allowed to take instead of the extra fruit trees offered for new members, some ornamental plants, shrubs or trees to the same value. Upon this we have not acted, confining ourselves strictly to the distribution of fruit trees, but we commend this inquiry to the consideration of members, knowing that our successors will desire to carry out the wishes of the Association.

Rejoicing in what has been done in the interests of fruit growing, and yet more at the prospects of usefulness opening before us, we lay our Report before the Association, and return to you the trust which, during the past year, has been committed to our hands.

All of which is respectfully submitted.

ROBERT BURNET,
President.

TREASURER'S REPORT.

To the President and Directors of the Fruit Growers' Association of Ontario :

GENTLEMEN—At the close of the last fiscal year there was a balance	
in the Treasury of	\$474 95
(See Report of Auditors, dated 2nd January, 1872.)	
Since that time I have received from Members' fees.....	1632 00
From the Government Grant.....	500 00
From the Special Deposit withdrawn from Bank.....	405 47
Making a total of.....	\$3012 42

I have expended under your direction the following sums, namely :—

For Prizes	\$60 50
Expenses of Committees and Directors.....	138 80
Stationery and Printing.....	151 12
Electrotypes and Coloured Lithographs.....	263 09
Postages and Telegrams.....	142 40
Advertizing.....	110 00
Express Charges and Freight.....	188 30
Copyist.....	96 00
Grant to Entomological Society.....	50 00
Sundries.....	4 15
Merrell and Coleman, for Vines.....	16 54
Nicholas and Newson, for Trees.....	45 60
W. S. Little do.....	65 35
Ellwanger and Barry do.....	77 25
C. L. Hoag and Co., for Vines.....	16 72
George Campbell do.....	23 50
Charles Arnold do.....	227 00
Smith, Clark and Powell, for Trees.....	298 25
Graves, Selover, Willard and Co., do.....	420 40
G. T. Fish.....	77 50
Beadle and Buchanan, Trees and Labour.....	224 49

Making a Total of..... \$2696 96

Which leaves, after deducting the Secretary-Treasurer's Salary..... 200 00

Making the total disbursements..... 2896 96

A balance in my hands of only 115 46

I have already contracted for two thousand copies of a coloured lithograph plate of the Beurre Clairgeau Pear for the embellishment of our next Report, according to your instructions, at a cost of something over \$300, including freight and duties. There are but few outstanding accounts; something is probably due to the Chairmen of some of the Committees, principally of those charged with the duty of making a personal examination of various sections of the Province, but the entire indebtedness on this account will probably not exceed fifty Dollars.

All of which is respectfully submitted.

D. W. BEADLE,
Secretary-Treasurer.

AUDITOR'S REPORT.

Abstract of Treasurer's Account for the year ending 26th September, 1871.

RECEIPTS.

1870, Oct. 4—To Cash on hand this date, as per audit.....	\$277 23
To Cash refunded by Customs.....	12 50
1871, Sept. 5—To Government Grant.....	500 00
To Members' Fees from Oct. 4, 1870, to Sept. 26, 1871.....	762 00

\$1551 73

1871, Sept. 26—To Balance Cash on hand..... \$474 95

Also at Credit of Association in N. D. Bank, including Interest made up to 30th June, 1871, as per Voucher..... 389 89

EXPENDITURE.

1870, Oct. 25—	By “Globe,” for Printing.....	\$1 00
	“ Grant to Entomological Society	50 00
26	“ Amount paid A. Morse’s account for Expenses....	4 00
Dec. 13	“ “ A. Slaight’s “ do.	8 00
	“ “ A. B. Bennett’s “ do.	17 15
	“ “ W. H. Mills’s “ do.	4 30
16	“ “ W. H. Boulton’s “ do.	2 50
31	“ “ W. L. Copeland & Co’s. for Stationery	8 75
1871, Jan. 21	“ “ A. S. St. John’s for Writing.....	2 00
Feb. 7	“ “ G. Leslie’s for Expenses.....	8 50
13	“ “ S. L. Goodale’s for Scions.....	27 40
	“ “ Duties and Express Charges on same	1 90
27	“ “ W. Saunders’ for Expenses.....	5 50
March 9	“ “ J. Campbell and Son’s for Stationery	29 90
13	“ “ G. Groves for Stamps and Envelopes	1 75
23	“ “ J. Cuthbert’s for Binding Reports... ..	4 00
April 19	“ “ R. Gourley’s for Writing.....	30 00
	“ “ J. Hindson’s for “	2 50
	“ “ Grant and Co’s. for Advertising.....	3 00
	“ “ J. E. Ellis’s for Cab hire.....	1 00
	“ “ Express Charges on Fruit to N. S....	4 35
	“ “ Rev. R. Burnet’s for Downing’s Fruit Book.....	6 20
Sept.	“ “ Account of Committee examining County of Elgin.....	24 20
	“ “ Wm. Saunders’s account for Expenses	4 60
	“ “ Beadle and Buchanan’s for Trees and Vines	372 61
	“ “ E. S. Leavenworth’s account Printing	34 25
	“ “ Rev. R. Burnet’s account Expenses &c.	12 30
	“ “ A. B. Bennett’s account Expenses....	4 00
	“ “ Secretary—Treasurer’s Salary.....	100 00
	“ “ Prizes as per Vouchers.....	112 00
	“ “ Prizes for Curculio.....	30 00
	“ “ Account for Electrotypes Eumelan vine	2 75
	“ “ Express Charges on same.....	0 80
	“ “ Secretary’s Travelling expenses for year	47 96
	“ “ “ Account for Postages, Telegrams, &c.....	59 75
	“ “ Freight and Express Account.....	47 86
Sept. 26	“ “ Balance, Cash on hand.....	474 95
		<u>\$1551 73</u>

We, the undersigned, having been appointed Auditors to examine Books and Accounts of the ‘Treasurer of Fruit Growers’ Association, beg to report that we have examined Books and Accounts, also the Vouchers, and find them on comparison to be quite correct, and that the foregoing is a correct abstract.

The balance in Treasurer’s hands on 26th September was \$474 95, in addition to this there is to the credit of Association in N. D. Bank, including interest made up to 30th June, 1871, \$389 89.

We also annex memorandum of disbursements since close of current year to date, amounting to \$204 82, for which we have compared vouchers. *

WM. J. MCCALLA. }
W. L. COPELAND, } Auditors.

St. Catharines, January 2nd, 1872.

Abstract of Treasurer's Account for the year ending 23rd September, 1872.

RECEIPTS¹

1871, Sept. 26—To Balance Cash as per last Audit.....	\$474 95
July 11—To amount Special Deposit withdrawn from N. D. Bank,	405 47
Sept' 14 —To Government Grant.....	500 00
To Members' Subscriptions during year.....	1632 00
	<hr/>
	\$3012 42
1872, Sept. 23—To Balance Cash in Treasurer's hands.....	\$115 46

EXPENDITURE.

1871-2-- By Amount paid Prizes and Awards, per Vouchers.....	60 50
" " Expenses of Directors and Committee Meetings,	138 80
" " Stationery and Printing.....	151 12
" " Electrotype and Coloured Lithographs....	263 09
" " Postages and Telegrams.....	142 40
" " Advertising.....	110 00
" " Express Charges and Freight sending out Trees, &c.....	188 30
" " For Trees and Vines as per Voucher of D. W. B.....	1492 60
" " Copyist.....	96 00
" " Sundries.....	4 15
" " Secretary-Treasurer's Salary....	200 00
" " Grant to Entomological Society.....	50 00
" Balance Cash in Treasurer's hands.....	115 46
	<hr/>
	\$2012 42

We, the undersigned, beg to report that the foregoing is a correct abstract of the books of Treasurer, Fruit Growers' Association. That vouchers have been furnished and examined, and all seems correct.

WM. J. MCCALLA, }
W. L. COPELAND. } *Auditors.*

St. Catharines, September 23rd, 1872.

THE PRESIDENT'S ADDRESS.

The year of grace 1872 will always remain a notable era in the history of the Fruit Growers' Association of Ontario—memorable in its annals as the year in which, from small beginnings, it has increased to over 1,600 members. The onward march of the Society's progress has been somewhat remarkable, and can only be accounted for on the faith the public have in the excellence of its aims. We are perfectly persuaded that had last year's report been in the hands of our membership in December or January, our list would have amounted to-day to not less than two thousand members.

There is, however, a good time coming, and the forecasting we made in our last annual address, that our interests and aims were only second to the agricultural interests of our Province, will yet be realized. Our Society is becoming a power in the land—a power for good. This power for good has been evoked by the admirable direction of the affairs of the Association by those more immediately connected with its government. I should certainly

fail of my duty, in being permitted to have the honour of addressing you, did I not particularize the names of Saunders, Beadle, Mills, Holton, Arnold, Bennett, Leslie, and Allen—gentlemen who have been always indefatigable in advancing the best interests of our Society. Indeed, the serious labour entailed upon our Secretary by our very success must sooner or later engage the deliberation of the Association. The amount of duty which he has discharged during the past year is something enormous. His correspondence alone would almost keep an amanuensis employed.

In speaking of the efforts put forth by the Association as telling upon the Province, evidenced by the large increase of membership, we are strongly of the opinion that much sympathy has been felt for and exhibited by the public towards the Society from the fact that our funds are economically managed, and from a large amount of money being disbursed at the lowest amount of expense to the Society. The mode, too, of expenditure has something to do with our palpable popularity—in fact, we have taken the country by storm through our liberality. The return of the fee for membership, in the shape of fruit trees for trial, the benefits being thus secured both to the member himself and to the country, has had much to do with our prosperity. The past direction which this outlay has taken ought to be followed up in the future, and every available means taken to educate our people, not only in a taste for good fruit, but also in the knowledge of good fruit trees. This distribution of trees in the past has produced wonderful results, and we believe that if the Directors exhibit the care and prudence in the future which have characterized the distribution of fruit trees, vines and small fruits, in the past, more important results will follow. The record of this course of action on the part of our Society will stand present and future testing, both by the published testimonies of successful trial of these fruit trees, and by the wide-spread, beneficial influence which the distribution of trees has exerted.

Next in importance to the distribution of fruit trees in benefiting our Society, has been the holding of meetings of our Association at different localities throughout the Province. We noted from our own experience these benefits as displayed at Goderich last year. Similar good has been effected by the successful meeting in Guelph in July last. We question if we have had anywhere a more spirited meeting than at Guelph—whether you take into account the lively devotion to horticultural matters by the inhabitants of the town, or the large amount of valuable experimental knowledge communicated to the Society by fruit growers from the surrounding country. It is no disparagement to the fruit growers at Guelph to say that the meeting of the Society was *needed*. We observe that the cherries exhibited at their Horticultural Show were divided into two classes, red and white, the names of either class being unattached! We imagine, too, that we, I mean the older members of the Association, learned also important lessons. For instance, that there ought to be a choice of similar varieties of trees for distribution, inasmuch as the tenderer varieties, of the same sorts, will not succeed in more northern latitudes of our Province.

In the same direction for advancing the interests of our Association has been the illumination of our reports with plates of the fruits of our distributed trees. This in the course of years will form a valuable record. To those of us who mingle much with amateur fruit growers, the increased interest evoked by our coloured plates must have struck us with great astonishment. Some of us incurred no little obloquy from the parties to whom we recently mailed our Report, when we could not furnish them with the coloured engraving.

By these foregoing and similar means will we keep the ball rolling. It is the duty, and ought to be the happiness of all our members to set their brains to steep, to devise the best means for the advancement of our Association—to use the language of a friend of mine, “Brains, Sir, there’s nothing like brains.”

This remark reminds me alike of my deficiency and of my duty—of my deficiency in being unable to enlighten or whet the intellect of any one of the intelligent fruit growers here present; and of my duty, that I ought to present, on such an occasion as our annual gathering, inferences and deductions drawn from our horticultural experience. My experience is so limited, my acquaintance with the general principles of our science so meagre, and my knowledge to use the rules of our art so inferior, that I must endeavour to give a mere summary of my success in pear culture—the varieties which I cultivate, and my mode of cultivation.

In my first essay in pear growing I had the good fortune to stumble on the grand first principle of fruit production. I refer to a dry soil. Before I planted a tree I thoroughly

trenched and drained my lot. My trenching was to the depth of three feet fully, and then I placed the rich top soil in the bottom, trusting to after enriching to prepare the surface soil for the proper reception and nourishment of the trees. Sufficient stress cannot be placed on the thorough drainage of the fruit farm. To say that it is an essential is hardly saying enough. Draining is a first essential; labour and skill would be thrown away without thorough draining. Draining we regard as much a requisite for fruit culture, as shelter is to animals from the inclemency of the seasons. It brings the condition of the soil into similar conditions with those of the atmosphere, and thus conduces to the health and productiveness of the plant. In addition to good drainage, it so happened that the contour of my lot required a large amount of filling up, almost six or seven feet in some places. On this artificial embankment many of my pears were planted, and all of them have done well. They seem to luxuriate in the depth and warmth of the virgin soil of which it was composed.

My choice of trees at first depended much on those with whom I came in contact—I might with truth say entirely depended on the advice of friends. The Seckel, Louise Bonne de Jersey, Glout Moreceau, White Doyenne, Stevens' Genessee, Passe Colmar, Napoleon, and Beurre Diel, were first attempted. If successful culture in any way depends on taking prizes, I may be said to have been a successful grower. I wish to speak, however, of the relative merit of these and other varieties. We are of opinion, after years of cultivation, that the Seckel is ranked much too high. Its diminutive size will always prove a great drawback to its commercial value. This is proved by its past and present market price in Boston, New York, and Philadelphia. It can never compare in value to the Clairgeau, Bartlett, or even Winter Nelis. It is said—I have often heard it repeated—that the Beurre Clairgeau brings from five-and-twenty to thirty dollars in the Boston and more southern markets. We question if Seckel would bring more than ten. Flavour, exquisite flavour, it certainly has, indisputably so, but flavour cannot stand before size in a market point of view. No, we have for many years greatly preferred the Flemish Beauty to the Seckel, and we do not despair to see it yet adopted by pear-growers as the standard of excellence. Whether one takes into account its size, shape, excellence of flavour, freedom from grittiness, or the hardness of the tree, it claims pre-eminence over the Seckel. It thrives and bears well at Hull, opposite Ottawa, and even further north. The shape and quality of the fruit, and the singularly exquisite symmetry of the tree, render it all that could be desired. In fact, it has all the characteristics of a good tree—health and hardness, fertility, vigour of growth, and persistency of foliage. We are at a loss to mention a tree or a fruit that commends itself more to the fruit grower.

The Louise Bonne de Jersey is scarcely second to the Flemish Beauty. It grows, perhaps, over a more extended area than the latter does. In every part of the southern section of the Province of Ontario it does well. With us, in the neighbourhood of Hamilton, it is most prolific and thrifty. Perhaps for a profitable market pear there are few or none to beat it. When the fruit is thinned out it arrives at a commendable size. The only fault of the tree is that it is apt to overbear; it requires constant thinning out, and will under these bear profusely every year. This quality tends to commend the Louise Bonne de Jersey, as quite a number of varieties bear well only every alternate year. On the whole, as a profitable pear both for the amateur and the professional, perhaps there is no one pear equal to the Louise Bonne.

The White Doyenne, though highly and justly esteemed, has never been a pet and favourite in our estimation. Its congener, the Gray, is a pear which we much prefer, but which is not much known, and therefore less cultivated. We raise splendid White Doyenne, but better Gray; in fact, with us it is almost preferred to the Sheldon, which is sometimes apt to be deformed in shape—the Gray Doyenne seldom or never. We are aware that the White Doyenne has much money in it to reward the cultivator—it is a valuable pear. Some years, however, we have had it crack, and even get greatly gnarled. This latter fault is a great drawback, when rent and livelihood depend on the excellence and beauty of the fruit.

The Glout Moreceau is an A. 1. fruit, but enjoys the unenviable notoriety of having a great many drawbacks to its excellence. It gnarls, and is full of gritty knots, and is seldom, very seldom, free from them. When perfect, it is excellent, the flesh buttery, piquant and juicy. Our experience of the tree is, that on stiff clay soil "it blights," as much if not more than any other variety of pear. I have only one tree left of this variety that has not fire-blighted. The most beautiful pyramid in my garden blighted this year, full of fruit, and in

early spring giving every indication of health and fertility. We have found, that owing to its knotty and gnarled appearance, it does not attract buyers—rather does it repel them. One year out of five it may bear a crop of fair excellent fruit; the estimate is not understated.

The Steven's Genessee is not worth cultivation. It is true that it bears large, showy fruit, but it is a poor keeper, and its fruitfulness is very uncertain. It is apt to be wormy with me, and I never had much satisfaction in its cultivation. I am now gradually topping over this variety with better sorts—by a kind of bud-grafting, brought to my notice by my friend Mr. Peter Murray, lately of Taymouth, Scotland.

The Passe Colmar has many of the bad habits of the Glout Morceau. It “blights” badly and early. At times it grows enormous fruit, in fact, abnormal. In such a case the excellence of the fruit is undoubted. Allowing every man to enjoy his own individual taste, I am ready to declare in reference to mine, that I know of few pears that in point of quality can compare to the Passe Colmar. Luscious it is, and that term scarcely adequately describes it when fully grown and fully ripe. To add that it is an ugly, ill shaped pear, is only the truth although it costs me a little qualm of conscience to say this of one of my pets.

“Napoleon” is only a third-rate pear; perhaps by saying *that*, I am ranking it too high. It is pretty enough when well grown; in some years, especially of sunshine, the flavour is not so bad, but as a general rule it is a poor watery pear.

The same cannot be said of the Beurre Diel. It is a first-rate pear, considering size, shape, flavour, and fruitfulness. It is really a prolific grower, and grows to an enormous size. I have grown so large that a tyro would have mistaken them for the Duchess. They do well, both as dwarf and standard. The fruit, however, is larger, and we think, better on the dwarf than on its own stock. On its own stock, it is an enormous cropper, the fruit fair and ungnarled, of medium size, and exquisite symmetry.

My second pear list was more my own choice, if I may be allowed the expression. Here I cannot resist the impulse to say how fruit growing increases the desire to excel others, and to enlarge the number under cultivation. My desire for new varieties soon grew into a passion, and I fear I broke the last commandment, as often as I saw my neighbour have a showy pear or a large dunghill. My next addition of twenty-five trees only whetted my appetite for more. A few of my new varieties were, Onondaga, Madeleine, Easter Beurre, Theodore Van Mons, Henry IV., Duchess d'Angouleme, Gray Doyenne, Bartlett, Belle Angevine, Ambrosie, Beurre d'Anjou, Bergamotte d'adette, Dearborn's Seedling, Brandywine, Osebano, Winter Nelis, Ros-tiezzer, Belle Lucrative, William's Bon Chretien, Vicar of Winkfield, Beurre d'Amalis, Lawrence, Sheldon, and a few duplicates of the few I had.

My experience of the Madeleine is, that it blights so badly that it is worthless as a variety for market purposes. I have succeeded in raising a few good samples of this fruit by triple working. At present there is no symptom of fire-blight on my grafts, though I have had it more or less all round. The Elliot's Early, we are persuaded, will take the place of both the Madeleine and Doyenne d'Ete. This pear, which was originally raised by Judge Elliot of Michigan, in the neighbourhood of Amherstburg, was introduced to public notice by Mr. James Dougall, of Windsor, to whom the fruit growers of our Province owe a deep debt of gratitude for his persevering efforts in introducing new and foreign varieties of pears into Canada. The Elliot's Early commended itself greatly to the Committee on Seedling Fruits—a report of which Committee has already appeared in the *Canada Farmer*. In passing, we may mention that Mr. Simon Roy, of Berlin, raised some beautiful specimens of this fruit this fall.

The Onondaga, or Swan's Orange, as it is called, thrives superbly well at Hamilton, and does well on clay soils. To those who are fond of a subacid fruit, there are few pears that can compare with the Onondaga. Its superb size and beautiful golden colour commend it to the amateur, though it must be admitted that a few are not partial to it on account of its tartness.

The Easter Beurre is a noble pear. With me it retains its monkish excellence, and I am as ready to crack it up as any churchman of the olden time. Perhaps, too, the season of the year at which it ripens has something to do with the esteem in which we hold this pear. It helps to grace the table at Christmas and New Years' times, and association with the pleasant has much to do with our likes and dislikes. For flavour and butteriness it is scarcely to be excelled. Its name indicates its time of ripening in March and April. I have kept it in good condition to the twenty-fourth of May. It has a tendency to grit, but a plentiful supply of leached ashes, as a top-dressing, will go far to remedy such tendency, and to give it a colour

on the cheek which is really superb. It is a pear which is indispensable in almost any collection.

The Theodore Van Mons is a light green, showy, pretty pear; I could scarcely call it first-rate. Henry IV. is to our liking, and is almost equal to the Seckel when carefully kept and well ripened.

The Duchess d'Angouleme is a mighty favourite with most pear growers. We must have and express our "own *think*" on this pear. We consider it very variable, and under some conditions an uncertain bearer. Let the spring be cold and damp, and the fruit will be sparse and scarce, and gnarled and knotty. In fact, in some years, and these at no distant intervals, it completely "damps" off, or rather, I ought to say dries off, just at the time when there is every prospect of its setting well. It is a pear that is very disappointing to an anxious cultivator, and yet withal it is a valuable pear. For size, and flavour, and excellence when well grown, it can hardly be beat.

The next pear that comes under our notice is a great favourite of ours, and would be with all fruit growers, if they only knew its excellence. I refer to the Grey Doyenne. It is infinitely superior to its congener, the white. For beauty on the dessert dish it can scarcely be excelled. Its deep and entire russet gives it a *distingué* appearance, which at once catches and captivates the eye of the amateur. We long for the time when it will come into general cultivation. The drawback, and drawbacks it has, is, that you can get plenty of fruit, but only a small modicum of wood. Grafted on a strong grower such as the Buffam, it does well.

Our's and everybody's favourite, the Bartlett, needs no commendation of ours. We should like to see our fruit growers unanimously give this old and well-known variety its former name, "William's Bon Chretien." On the continent of Europe, and in England, it is all but universally known under this designation.

The Ambrosie is not worth cultivation—it is positively worthless; like many other things it is more showy than good. I have topped my trees of this variety with more profitable sorts.

Beurre d'Anjou is so well known, that it is unnecessary further to allude to this variety than to say that it is Marshall P. Wilder's favourite pear. Its distribution among our members will bear a narrow inspection—the reports already received speak well of its undoubted excellence.

The Bergamotte Cadette and Dearborn's Seedling may go well together. We do not and cannot esteem either variety. Dearborn's Seedling has acquired an undue reputation. A different statement must be made of the Brandywine. To our taste it is one of the best of pears. When eaten just when ripe, it is something delicious—a day after it is ready it assumes a bitter acid, which renders it very disagreeable. It is a fine, large, showy and beautifully marked fruit when grown in the sunshine. It is not much known—the tree is a beautiful upright grower, foliage very green and close, and as a pyramid cannot be excelled by any other pear tree known to me.

The Osebano is a pretty little well flavoured pear, but is not such a favourite with me as with my friend Mr. Saunders, of London, on whose farm it does well. It unfortunately happens that the tree often gives way just when you might expect a plentiful supply of fruit—you nurse it through the trials of infancy, and just get it to maturity, as is thought, when suddenly it gives way, and bears the bitter fruit of disappointment.

The Winter Nelis is a superb pear—it needs no recommendation. Our Association should hold out a prize for any grower who would infuse a little bone and sinew into its branches, and to any reformer who would straighten out the boughs.

Few early pears can equal the Rostiezer. It is prolific, juicy, rich, and on the whole, a pear not to be despised. It will amply repay cultivation. There is money in it for the market. It comes in early, and although the fruit is small, it commands a good price.

The Belle Lucrative, or, as it is familiarly known, the Fondante d'Automne, like all the family of the *Fondantes*, is a splendid pear. Before we made the acquaintance of the relatives of the Belle, we were quite pleased to rejoice in her smiles; but having tasted the excellence of the Fondante de Malines, and even of the Fondante du Comice, we cannot but give them the preference.

The Belle Lucrative is good, excellent, the Fondante de Malines is better. The tree is a better grower, the fruit is better flavored, the size of the fruit is larger.

That old variety, representative of a long-faced class of worthies—the Vicar—is like

many worthy clergymen, a hard nut to crack. Few people know *when* or *how* to treat him well. His excellence is often never seen—the more the pity. The Vicar should be laid and kept in a cool dry room, barrelled up is a good plan, and laid on its side, and then when the March winds begin to remind us of buds and spring, wrap him up close in flannel, or in a paper bag, and keep him in the dining-room from six to eight days according to the warmth, and then he will yield such a flavour and rich repast, as will give satisfaction to and call forth the praise of the most fastidious.

We have fruited the *Beurre d'Amalis*, and can conscientiously say that this fruit is far too little known. The beauty of the pear, its size, its rich mellow flesh, freedom from grit, should long ere now have commended it for general cultivation. When properly pruned, which is to leave it with long *Dominie Sampson*-like arms, it bears bead-like strings of lovely fruit, which amply repay both the amateur and the producer for the market.

The *Lawrence* is among the best, if not the very best pear for winter use. We know few pears that are better and more luscious at New Year than this fruit. It keeps well, carries well, and deserves to be universally cultivated. The tree on its own stock grows luxuriantly, but the fruit is apt to spot, as if the rain had an affinity for its bright light beautiful green skin. On the dwarf it attains to a fine size, and as we think, to a good flavour. It is one of the best winter pears in this locality. Perhaps it reaches its greatest excellence in the *Niagara District*, luxuriating as it does in the fine rich alluvial deposits in the neighborhood of the *Niagara River*.

We have fruited the *Vezouzier* and have found it perfectly hardy in its wood during the severest seasons. The fruit is large and handsome—the tree an upright grower, and very thrifty.

The *Willermoz* is a large handsome pear, and is too little known and cultivated. It is a valuable winter variety, and amply repays the care of the pear cultivator. The blight sometimes takes this tree, generally on the trunk and leading branches, while the remainder of the tree appears to be good and the fruit good.

We desire to make mention of rather a remarkable pear tree, viz., the *Beurre Navez*. To those of you who are not acquainted with this pear, my description may seem extravagant. It is really well described as “a bag of juice.” It is, however, not only juicy but rich in flavour, and of excellent quality. Mr. James Dougall was the first who brought this excellent pear to my notice,—it is in all respects a superb pear.

The *Beurre Millet* is the most remarkable pear in my collection. It is more highly coloured, of a deep mauve, than any other pear known to me. What is said of the colour may with equal truth be said of the flavour. I prefer it to the *Seckel*, which is indeed making a strong assertion. The appearance of this pear, just like the diminutive appearance of the *Seckel*, tells sadly against its many excellences.

Another pear demands a passing word, it is the *Beurre Superfine*. A sample from my garden may be seen in the collection at the palace grounds, entered for the \$50 prize. The fruit is something beautiful, and *three* varieties, or three variations in colour and shape, may be gathered from the same tree. These are on the table for the inspection of the Association. Highly coloured, it has the brightest green spots interspersed amid the russet. The tree, which I got from Mr. Holton, Hamilton, may be said to lean to the tender side. In Hamilton and neighbourhood it does well, though apt to blacken for a quarter of an inch some years after it has been early pruned. This pear and the *Beurre Bosc* stand much in the same relationship as regards hardiness. Neither of them are entirely hardy, and yet both trees afford the best of fruit. The *Beurre Bosc* is rapidly growing into favour. Its peculiar peary form, russet colour and great excellence constitute an A-1. pear. It is one of the finest pears grown in all respects. It is not blighted with me; it is a little late in coming into bearing. We know of few pears that will stand comparison with it. Its very colour and shape have a charm. Deep russet, and inclining to the Vicar class in shape, though it has its own peculiar form, it yet strikes even a stranger to it as singularly peary. We know that the fruit is persistent, and notwithstanding the great weight of the pear hangs well on the tree. We can heartily commend the *Beurre Bosc* for cultivation in the more temperate districts of our Province. As a market variety, we know of few equal to it. Indeed there is a vast deal of money to be made out of it. We are aware that it is finding its way into general public favour. If any appear for sale in our market, they are quickly spoken at any price the seller may demand.

The Summer Franc Real is also a pretty looking pear, but has the same drawback as the Beurre Bosc and Beurre Superfine. It kills back with the frost after early pruning in cold weather, and has a tendency to present the appearance of leaf-blight. The flavour and round appearance of the fruit commends it to the amateur, but as a variety for general cultivation, we could not recommend it.

We have fruited and tasted the Beurre Langelier, and are impressed with its good qualities. As a winter variety, we know of few better. It is indeed not so large as some other winter varieties, but it attains to a good size, the fairness of the fruit, it being little subject to insect pests, and its really good flavour, are rapidly bringing it into notice. It is well worthy of cultivation.

The Soldat Laboureur is a fine showy pear, but lacks persistency, and is apt to fall from the tree. A slight breeze is sure to bring the fruit down, and as it gets nearer to maturity the greater the tendency to fall off. It is of a peculiar dirty yellow colour, apt to russet in spots here and there on the shady side, and is by no means a prepossessing pear.

This cannot be said of the Delices de Hardenpont. This pear has a very bright and beautiful appearance, acquiring in the sun a perfectly red cheek. It is a prettily shaped pear, good to eat when ripened well, and the flavour is excellent.

The Ananas d'Ete is a pear too little known, and therefore too little cultivated. Thanks, however, to our reported discussions, the pear is gradually coming into notice. It has many good qualities. We believe it to be little inferior to the Bartlett, near whose season of ripening it comes to perfection. Its showy appearance renders it an object of attraction to the enthusiastic amateur. When pulled early and properly ripened in the house, the flesh and flavour are all that could be desired. We have never yet seen a gritty specimen.

A pear rapidly becoming an object of favour is the Beurre de Noel. We presume, from our moderate acquaintance with French, that the Beurre de Noel means the Christmas Beurre. It is a thrifty prolific grower. From six to ten generally grow upon a branch together, and notwithstanding the number on the cluster, they often attain to a good size. As a market variety we question if the Beurre de Noel has a successful competitor. It bears prolifically, and bears every year.

The St. Ghislani is a recherche pear. For amateur growers it has always seemed to me a model pear. It has a property, in an eminent degree, which I think the French call *fraiche*. It requires to be tasted to be understood. This pear ripens about the middle of September; and is a valuable early autumn pear. It is too tender to bear transportation,—marks easily; as a fancy fruit, it cannot be excelled for the brilliancy of its colouring and the crispness of its flesh.

This year, for the first time, we have samples of the Beurre de Beaumont. I will submit this pear to the taste of our Committee on New Fruits. It also appears in the collection for the \$50 prize. It is a small roundish speckled pear, dotted with minute whitish spots.

I may be allowed to mention the Kingessing, an excellent American variety. We have found that its keeping qualities are not first-rate,—it soon disappears, when once it has ripened.

It is premature to speak of the Goodale, though we have tasted it. Our experience of the tree is encouraging. With me it is perfectly hardy. I grow it on its own stock, and also on the quince. On its own stock, it is a very free grower, and perfectly hardy.

Clapp's Favourite in its wood and growth might almost be mistaken for the Flemish Beauty. The wood is stronger, the stalk of the leaf firmer—in other respects, the colour of the bark, and the habit of the tree is not unlike that of the Flemish Beauty. Its fruit steadily advances in public favour—it is a favourite.

The Josephine de Malines, and the Baron de Mello may be placed as pairs. The excellence of the one may be justly ascribed to the other. The Josephine de Malines bears beautiful fruit. In point of excellence we fail to draw any distinction between it and the Beurre d'Amalis. The shape and flavour of the fruit are not very unlike—both are excellent pears. We are inclined to place them both in the front rank.

Another highly-flavoured and excellent pear for amateur cultivation is the Duchess de Berri d'Ete. Every year as my trees get older the fruit improves with me. When fully ripe, it has a most rich piquant flavour. A friend of mine, and a good judge in pears, wrote me the other day that it was not far behind the Seckel. But for a gritty tendency, it would rank high. Its astringent strong subacid flavour prevents it being a favourite with some.

Among the pears which I cultivate, few can compare with the Duchess d'Orleans, or, as it is generally known among pear growers, the Beurre St. Nicholas. As a market variety it stands among the foremost. It has a most taking appearance—a bright ruddy cheek where exposed to the sun, with a shade of the most delicate pale yellow where protected by the leaves. Its flavour is something delicious, and its size is not very far short of a large Louise Bonne de Jersey. We strongly recommend this pear for general cultivation.

The Graslín is a very superior fruit. It was first brought to my notice by Mr. James Dougall, of Windsor. At Windsor it grows superbly well, and attains to a great size and beauty. It does well with me. The specimens which I have raised have been splendid. To have it ripened up to perfection, it must be kept in a close drawer, or what is better, placed in a paper bag. It attains its greatest richness about the first and second week in October. We cannot too highly recommend this admirable pear.

The Triomphe de Jodoigne is the next pear to which we desire to turn your attention. The fruit is very large and handsome. We say *very large*. We have fruited it, and when on the tree, it attracts the attention of every passer by. It is a strong luxuriant grower, with an amazing thick leaf. The fruit is superb to eat. When ripened up it is a triumphant pear. We rank it very highly in our collection. It deserves general cultivation, and owing to its hardiness and vigour will prove a great benefit to pear growers.

Elsewhere we have stated our opinion of the Madam Eliza. We have not changed that good opinion. It is of the Vicar class of pears, is a long and good keeper, large size, and of excellent flavour. It is good till the middle of November, and with care can be kept even later.

Some years ago we exhibited the d'Amalis panache. It is rather a remarkable pear. Its beauty consists not only in all the excellence of its congener the Beurre d'Amalis, but also in the marvellous beauty of its skin, being singularly striped with bands of green and yellow. It is a rampant grower, and the wood is as beautifully marked as the fruit.

The Vicompte de Spoelberg is a luscious pear. Its shape is not unlike the Passe Colmar, its flavour rich, and the pear very juicy. It has a singularly sprightly flavour, and is a pear only to be known to be highly esteemed.

Among the finest of the sorts which I cultivate is the Fleur de Níege—a pear of singular excellence and beauty. It will amply repay a generous cultivation with abundance of fair fruit.

We cultivate quite a number of other varieties, but we are not aware that any of the remainder attain to greater excellence than those already particularized. Some are of rare excellence, such as the Beurre Gris d'Hiver Nouveau, Nouveau Poiteau, Doyenne d'Hiver, Paradise d'Automne, Ott, Supreme de Quimper, Kirtland, and Rousselet de Stutgardt, Beurre Kœnig, Blanc Perne, General Todleben, Prevost, Marechal de la Cour, and a few others.

The judgment which has been formed, and here expressed, is not unlikely to be modified in the experience of others, owing to difference in soil and climate. The pear grower, however, may depend on the accuracy of my description so far as I have been able to express myself with decision. We have thought it best not to mix up new varieties with the old.

A new variety that has fruited in my garden during the summer, is the "General Negley." The fruit in shape is not unlike that of the Summer Franc Real, firmer, however, in the flesh, and where exposed to the sun, very highly coloured with a deep dull red.

The importance of introducing new varieties was very early in the history of our Society seen by Mr. Holton, of Hamilton, who suggested the giving of a prize for their production.

We continue to foster the introduction of new varieties, not only of the pear, but of the apple, crab, plum, grape, peach, strawberry, and other small fruits. Nobody can overestimate this important branch of the efforts and aims of our Society. We are persuaded from the rapid march of horticultural progress of late, that better fruits than we now possess are not only probable but possible. During the last year Mr. Dougall, Windsor, has forwarded to your committee a seedling cherry and a seedling pear, both fruits of superior excellence. Mr. Simon Roy, Berlin, sent the same pear as Mr. Dougall had done. Reports on these fruits have been forwarded to the *Canada Farmer* by the committee. Mr. Glass, of Guelph, has raised a beautiful plum, which perhaps the Association would do well to disseminate.

Mrs. Colbeck, of Hamilton, has raised a superb seedling peach, of great beauty, flavour, and size.—Mr. R. C. Cooper, of Hamilton, a very superior seedling plum. And thus the interest

in our Society keeps growing. Every effort stimulates to observation and action. There are many seedlings scattered through our orchards, which only require to be brought into notice to ensure cultivation. Since we commenced to prepare for addressing you, we have had our attention directed to a remarkable seedling shown at the present exhibition by Mr. Brooking, Dundas. It is not unlikely to carry off Mr. Holton's suggested prize.

I feel that I have trespassed on your time and patience. I cannot retire from the important office to which your favour has raised me without most heartily thanking the members of the Fruit Growers' Association of Ontario, for the unfailing kindness and forbearance which they have exhibited towards me during the lengthened period in which I have presided over their affairs. I have striven, I know, to do all I could for your interests, but it is not very much one called on to discharge other and more important duties can do for the members of a Society, every member of which, it may be, surpasses your President in the perfect knowledge of some one branch of our cherished culture. This remark reminds me very forcibly of your courtesy. On retiring from your honoured chair, I would respectfully suggest to the Association, perhaps not the least valuable of my suggestions, that their choice for my successor could not better fall on any one than on some gentleman who has leisure to devote to your interests, and that deep love of horticulture, which will render any burden in the charge of duty an abiding pleasure.

I will ever look back with fond remembrance to the happy and uniformly harmonious meetings which have characterised all our intercourse. The earnest desire of your retiring President is, that the same kindly feelings of love and affection which have marked the Society's existence in the past, may continue to mark the proceedings of our Association in the future, that a spirit of honest and earnest rivalry may so embue each of us, that our individual and single purpose may be to best advance our common interest.

Year after year reminds us of the ingathering of the fruits of autumn, and also of the Providential ingathering of the spirits of men, and of our members into the Lord's garner. An eminent member of our Society, himself the son of a most prominent member, and one of the founders of our Association, has passed away from us. I refer to Mr. William Craigie, Barrister, of this city. May such and similar lessons come home to each of us, and urge us to "do with all our might those things that our hands find to do." And when at last the chain of friendship which has bound so many of us together in labour and in love shall be broken; when the last link shall be sundered and the fruits of this world shall delight us no more; when the culture, training, and sorrows of earth shall culminate in the purity, perfection, and bliss of heaven, may we all sit down together at the feast of immortal fruits—

"Where Gilead's balm in its freshness shall flow,
O'er the wounds which the pruning-knife gave us below."

ROBERT BURNET,
President,
F. G. A. of Ontario

HAMILTON, 24th September, 1872.

REPORTS OF DISCUSSIONS

WINTER MEETING.

The Fruit Growers' Association of Ontario held their usual winter meeting in the City Hall, Hamilton, on the 8th February, 1872. There was a large attendance of members from many parts of the Province, from Kingston and Oshawa in the East, to London in the West, including nearly every intermediate point.

The President, Rev. R. Burnet, called the meeting to order, and after the reading of minutes of previous meeting, the members listened to the reading of an essay by P. E. Bucke, of Ottawa, on Practical Climatology, W. H. Mills, Esq., read a paper on Radiation and its relation to tree growth. These papers were listened to with marked attention, and referred, with thanks to the writers, to the Committee on Publication.

FRUIT IN MANITOBA.

Mr. Spencer, recently returned from Manitoba, where he had been largely instrumental in organizing an Agricultural Society, being present, the Chairman called the attention of the meeting to the fact, and requested him to take part in the discussions. Mr. Spencer very gracefully acknowledged the compliment, and being requested to give some account of the condition of fruit culture in Manitoba, made some very interesting statements. He said that scarcely any fruit was cultivated there, but there was an abundant supply of some of the small fruits found growing in a wild state.

The apple trees that had been introduced into Manitoba from more southern latitudes had all failed, and he believed the only way to secure trees sufficiently hardy to endure that climate would be to raise them from seed. There is a species of crab apple found growing there but it is too austere to be of any use. Wild plum trees abound there, apparently of several varieties, and many of these are quite good, much better than the wild plums found growing in Ontario. Raspberries and strawberries are found growing wild in great abundance, and are of good size and excellent flavour. Wild grapes are also found there, and two varieties of cranberry—the Trailing or Marsh Cranberry, and the Highbush Cranberry; the latter in great abundance. There is also a species of hop found in a wild state, which is very fine. The vegetables that are raised there are of excellent quality, and would compare very favourably with those of Ontario. The cattle were also very fine; the grade cattle of the country were not much behind the thorough-bred of our own Province.

Some of the members suggested that a Fruit Growers' Association should be established in Manitoba, to whom this Society might send scions of the most hardy varieties of apple, &c., and expressed the hope that Manitoba might be in this way soon supplied with many valuable fruits.

OVERSTOCKING THE FRUIT MARKET.

Mr. A. M. Smith read a paper on the danger of overstocking the fruit market, for which he received the thanks of the Association, and the meeting proceeded to the discussion of that subject.

Mr. Osborne spoke of the disappointment which many had met with this season in sending fruit to England, in some cases not realizing enough to pay expenses of shipment and sale. This he believed to be owing to improper management, and remarked that good paying prices had been realized by those who put up their fruit in a proper manner, sorting it well, packing it securely, and forwarding it promptly. The fruit of Ontario was not excelled by that of any part of the apple-producing region.

Mr. Durand believed that the production of a large supply of good fruit in any part of the country would turn the attention of dealers to us, and so increase the number of purchasers, that there would be a competition among the buyers that would secure to the grower good prices.

Mr. Clemens believed there was so large a part of the country but poorly adapted to the raising of fruit, that the demand existing there would consume all the surplus fruit that could be grown in the fruit-raising districts.

Mr. Watson thought that his experience did not indicate any lack of demand, for when he was a boy good Snow apples only sold for twelve-and-a-half cents, which now readily brought a dollar-and-a-half; and, reasoning from past experience, believed that the demand would fully keep pace with the supply.

Mr. D. Hammond thought that the quality of the fruit raised was constantly improving, and that this had a tendency to keep up the demand. In his locality there was a good fruit market.

Mr. Spencer, of Manitoba, remarked that fruit can now be sent to Winnipeg, *via* Duluth, without any land carriage. If gentlemen present thought the price obtained for apples in Glasgow to be remunerative, he would tell them that at Winnipeg, instead of selling for twenty-seven shillings and six pence, ordinary apples found ready sale at twenty dollars per barrel, and one had to be sharp to get them at that.

Sheriff Davidson stated that there was a time when at Berlin there was no sale at all for what little fruit was then raised there, but now the best prices were paid for good fruit. He mentioned also that he had found dry leaves an excellent material in which to pack apples.

Mr. Haskins complained that the Hamilton market was very poorly supplied with good fruit, that in fact the most of it looked as though the best had been taken out and sent to some other market, and expressed the hope that fruit raisers would at least be able to supply Hamilton with what fruit she needed.

Mr. Osborne exhibited to the meeting some fine bunches of Isabella grapes which he had kept, remarking that a considerable quantity of these grapes could be sold at this time, at prices varying from fifteen to twenty-five cents per pound, and said that if fruit raisers would take the trouble to preserve those fruits that were abundant in the autumn, until this season of the year, they would secure good prices and be well repaid for their trouble. On being asked how he had preserved these grapes in such fine condition, he stated that he allowed the grapes to remain on the vine until they were perfectly ripe, then when they were quite dry he cut them from the vine, handling the clusters carefully by the stem, and laid them in shallow boxes, first placing in the bottom a layer of dry leaves, and upon these a layer of grapes. In this way he filled the box with alternate layers of grapes and leaves, closing with a layer of leaves. The boxes were then nailed up tight, and buried in the ground in a dry spot in the garden, not sinking them very deep, but ridging the earth up over them. This morning he had dug them out with a pick, the ground being frozen, and found the grapes to be all in as perfect a state of preservation as those he now exhibited. He had been led to try this method from finding grapes on the ground in spring which had been covered during the winter with leaves, in a very fair state of preservation, and thought he would try the method he had just now described, and which in this instance had been so very successful.

Mr. Grey stated that one fruit-dealer in Toronto had, last fall, imported over two tons of grapes, which he thought might as well be grown in Canada. For the past thirty years prices had been good in that market, and he believed they would continue so.

Mr. Woolverton thought it might be possible to exceed the demand for summer apples, but in winter fruits there was no danger.

Dr. Cross thought there was danger of growing too many of the small fruits. He had sent strawberries to Toronto for which he had realized nothing, and last year was unable to sell his Bartlett pears, the dealer in the city telegraphing to him not to send them.

Mr. Caldwell thought the demand for first-class fruits was continually on the increase; of these the supply would never be too great.

Mr. Graham said that at Fort Erie there was a constant demand for fruit, especially for apples, pears, &c., the Buffalo market taking everything they could raise. Cider apples were bought up, at very good prices, for the manufacture of vinegar.

Mr. Allen, of Kingston, would discourage the production of any but the choicest varieties of fruit, and the sending to market of any but choice samples. A gentleman near Poughkeepsie, N. Y., sent annually to Europe several thousand barrels of apples, each apple very nicely wrapped in silver paper, and for these he obtains high prices. The wrapping of each apple secures a careful examination of each, and the rejection of all that are imperfect. He believed that the very production and sending to market of choice fruit of itself created a demand, and that the more abundantly consumers were supplied with good fruit, the more they would consume.

DISTANCES OF PLANTING.

The second question was taken up after recess: At what distance apart should apple and pear trees be planted?

There was a very general expression of opinion, the burden of which seemed to be that about thirty feet apart each way was a suitable distance for apple orchards, but twenty feet each way was quite sufficient for standard pear trees.

Some of the members thought that some varieties of apple, those that did not make large spreading heads, such as the Early Harvest, Duchess of Oldenburgh, Northern Spy, &c., might well be planted at twenty feet apart each way.

Mr. Caldwell remarked that it was found to be desirable to plant trees much closer together in the northern districts—say in Minto, Garafraxa, &c.—than in the Niagara district. The trees in the northern sections suffered so much from cold that it was necessary to plant with reference to the peculiarities of that climate. When planted close together, and trained low, the trees protected each other, so that while a distance of forty feet each way would be very suitable in the warmer and more southern parts, in the northern he

would advise planting apple trees not more than 25 feet apart each way. From his own observation he could say that long-stemmed trees in that part of the country were not the thing, and that those who had tried the experiment of low training and close planting had been much more successful.

Mr. Grey, of Toronto, fully coincided with Mr. Caldwell. The planters in the northern sections were enquiring for low-headed trees, having become convinced of the superiority of such trees for their locality over the old-fashioned style of long trunks. It might also be well, he thought, to plant the pear trees between the rows of apples.

Mr. Morden advocated planting the trees further apart than the distance recommended by Mr. Caldwell, on the ground that when planted so near together, the roots of the trees would so interlace and exhaust the soil of the requisite fertility. On this account he advocated planting trees at considerable distance apart. He spoke of an orchard which he had grown in the County of Hastings, where he had pursued the plan of wide planting and high training, and believed the orchard had been a success, comparing favourably with any.

Mr. Morse was partial to the quincunx form, planting the trees in rows thirty-three or forty feet apart each way, and then planting an intervening row by placing a tree in the centre of each square formed by four trees. He thought that in this way the desired protection was secured, while at the same time the distance was so increased between the individual trees that no evil effects would arise from interlacing of roots or branches.

Some remarks were made upon the correspondence existing between the form of the top and the form of the root, some maintaining that those trees which formed a broad spreading top also threw out wide spreading roots; while those having a fastigate top sent their roots more perpendicularly into the earth. To this it was replied that as our trees were grafted upon some seedling stock, it was probable that the roots would assume the style of growth natural in the seedling stock, and not that of the inserted grafts. This led to some discussion upon the influence which the scion exerted upon the growth of the stock. Some instances were mentioned where it was manifest that the root growth was affected by the scion, but the instances that are well authenticated did not seem to be sufficiently numerous to admit of any general conclusions on this point.

PLANTS FOR DISTRIBUTION.

The meeting having been asked to state what trees or plants the members desired should be sent out for trial, it was suggested by Mr. Ball, of Niagara, that it would be well to give some nut-bearing trees a trial, such as the Filbert, which he believed had done well in some localities.

The President remarked that he had succeeded in raising them at Hamilton.

Mr. C. Arnold, of Paris, stated that he had grown the English walnut (*Juglans Regia*) and that last year they ripened nicely.

Other members remarked that they had succeeded in growing the tree, but not the nuts.

The President then announced that any suggestions with regard to the kind of tree to be distributed hereafter would be acceptable from any member, and that suggestions might be addressed either to the President at Hamilton, or to the Secretary, at St. Catharines.

MEETINGS.

The places for holding the succeeding general meetings of the Association for this year were then discussed, and it was decided that the summer meeting should be held in Guelph, at the call of the Secretary, and the fall meeting in Toronto. The annual meeting for the election of officers, &c., will be held in the City of Hamilton during the week of the Provincial Exhibition.

FORMING HEADS OF ORCHARD TREES.

The third question was taken up—At what distance from the ground should orchard trees be made to branch?

Mr. Martin favoured low heads. He thought these shielded the trunks of the trees from the heat of the sun in summer, and that on such heads the fruit ripened earlier and was more easily gathered.

Mr. R. N. Ball thought that six feet from the ground was a very suitable height, answering well for all purposes. The ground could be cultivated under such trees, the fruit could be conveniently gathered, and when the trees acquired size they sheltered each other sufficiently.

Mr. Caldwell advocated low heads as necessary in the colder sections, and thought that ploughing and deep cultivating in the orchard was very injurious to the roots; also that when the trees branch low the weeds are unable to make any luxuriant growth, being too densely shaded by the tree tops.

Mr. Morden was opposed to low heads; believed that in practice it only amounted to growing three or more trunks instead of one. He thought, from his own experience in the County of Hastings, that there was nothing gained by training trees low.

Other gentlemen stated their views, a majority of whom were in favour of forming the head at about six feet from the ground. If the branches came out lower than this, the weight of fruit and leaf soon bent them to the ground, so that great inconvenience was experienced from these pendent branches sweeping the ground. There is a just mean in this matter, which may be varied by the habit of growth of the particular variety, or by the peculiarities of climate and exposure to winds.

The discussion was enlivened at this stage by the reading of a carefully prepared paper by A. Macallum, M.A., on "Some of the meteorological conditions that obtain at Hamilton." His Essay was received with thanks, and referred to the Committee on Publication.

CROPPING ORCHARDS.

The fourth question was then considered, namely—Should any crops be grown in the orchard?

Mr. R. N. Ball thought it was well to cultivate the orchard while young with crops which did not exhaust the soil, as peas, beans, &c.; but that after the trees have come fairly into bearing, no crop whatever should be grown in the orchard.

A large number of members expressed their opinions, but the prevalent opinion was strongly in favour of growing only such crops as those mentioned by Mr. Ball, or other hoed crops, as turnips, &c., while the trees are young; and that in no case should crops of grain, as rye, wheat, &c., be grown in the orchard.

VARIETIES OF APPLE—WHAT PROPORTION?

The fifth subject was—In planting orchards what should be the proportion of summer, fall, and winter apples, in every hundred trees?

Mr. R. N. Ball would plant all winter fruit, if planting for market. Would plant no more summer and fall fruit than was needed for home use.

Mr. Arnold thought that some summer fruit might be safely planted for market, such as the Benoni and Summer Strawberry. There was but little demand for fall apples. At that time grapes, pears, and sometimes peaches, filled the markets, and when these could be had in abundance the demand for apples would be light.

Mr. Allan thought that by far the larger part should be winter sorts.

Mr. Caldwell advised that two-thirds of the apple orchard should be of winter varieties, the other third to be made up of summer and fall sorts. This arrangement was about what each required for family use, and would meet the requirements of the market.

Mr. Watson remarked that for six weeks in the fall after the early apples were gone, there were no good table apples to be had in the Toronto market at any price, and that good dessert apples would there command a ready sale.

Mr. Smith thought that orchardists had made a great mistake in confining their planting so exclusively to winter varieties; that there was a considerable demand for summer apples, much greater than the present supply.

Mr. McGill would plant one quarter of his orchard with summer apples.

DECAY OF BARK ON APPLE TREES.

Mr. Morden enquired what was the cause of the loosening and decay of the bark on apple trees? He said that this decay of the bark occurred on the trunk and main branches,

and generally on the south-west side of them. It sometimes extended for a considerable length on the trunk of the tree, and even below the snow line. After a time the bark becomes discoloured at the affected place, gradually becoming dry, dead and black, quite down to the wood.

Mr. Beadle remarked that he had noticed this disease in his own part of the Province. It was usually in the form of a black spot, of variable size, sometimes on the trunk of the tree, sometimes on the large branches, and always on the south and south-west side, where the surface was exposed to the direct rays of the sun. When the tree inclined to the north-east, or the branches extended horizontally to the north or north-east, and were exposed to the full power of the sun, there these injuries to the bark were found. He had never seen them on those branches which extended southward, or that grew nearly upright, nor on the trunk of a tree that stood perpendicularly, or that leaned towards the south or south-west. When the branch of the tree or the trunk inclined so that the sun's rays fell on them at right angles to their surface, or nearly so, then these black spots appeared. He believed they were due to the action of the sun, perhaps the joint result of frost and sun-heat. It might be that the mischief was done in the later days of winter, when the sun has acquired considerable power, and the nights are very cold with severe freezing, and the air remaining frosty during most or all of the day, while the unclouded sun is shining with full power on the bark of the tree. He had never seen any such injury on any other side of the tree, nor on any trunk of a tree not thus inclined, nor on any where the trunk or limbs were screened from the sun's rays. An examination of the injured spot revealed no cause, but presented an appearance as though the injury had begun in the inner bark, next to the wood of the tree. He suspected that a careful examination of the trees spoken of by Mr. Morden would show that they were thus exposed to the action of the sun, and that the only remedy was protection in some way from the sun's rays. The fact mentioned by Mr. Morden that he had never seen the Northern Spy thus affected, strengthened Mr. Beadle's views, as this tree was remarkable for its perpendicular habit of growth, on both trunk and branches.

Mr. Allen was of opinion that this affection was due to solar heat. It was well known by woodmen in the neighbourhood of Kingston that forest trees decay chiefly on the south side.

The President had seen this disease, but never where the trunks of the trees were shaded. Apricots and nectarines will thrive well on the shaded side of the house, but fail when planted on the sunny side.

Mr. Bagwell had caused a new wood to form over these injured spots by carefully cutting all the dead parts away, quite down to the wood.

The President had also succeeded in causing such a growth, and believed it had been greatly promoted by covering the wound with a thick plaster of mingled clay and cow-dung, which had shielded the injured part from sun and air.

Considerable discussion ensued as to the action of frost and sun upon the cells when filled with sap. Intense frost crystallizing the sap, and so causing it to expand, might rupture the cells in which it was contained. And perhaps when not ruptured by the crystallization of the sap, but considerably distended by this cause, the sudden increase of heat from the sun's rays might so expand the air contained in the cell, before it had melted the sap, as to rupture the walls of the cell, and in this way cause the destruction of the tissue.

MR. BEADLE'S WORK ON CANADIAN HORTICULTURE.

Mr. Morden introduced the following resolution, seconded by Mr. Townsend:—"That this meeting is much pleased to learn that the Secretary of this Association has prepared a work on fruit culture and gardening in Canada." He supported this motion by stating that a Canadian work of this kind was very much needed, and he believed that Mr. Beadle's forthcoming work would do much to advance the interests of fruit growers in this Province.

Mr. Allen remarked that it was of the greatest importance to have such a work written by a Canadian, as all the American works fail to give the information most needed by Canadians.

Mr. Beadle thanked the meeting for their kind expressions of confidence in a work which they had not seen, and trusted that their expectations would not be wholly disap-

pointed. He requested the members who might take the trouble to look into the book to make a note of any omissions that might present themselves, and kindly favour him with their suggestions; for should such a thing happen as that a second edition should be called for, he desired to make it in all things as complete as possible. It had been written for Canadians from a Canadian stand-point, and he should be most happy to receive from them any suggestions that should enhance its usefulness to his fellow-countrymen.

SUBJECTS FOR DISCUSSION.

The following subjects were suggested for discussion at a future meeting:

What system of drainage should be adopted for orchards?

What is the cause of trees being raised out of the ground during winter?

Is mulching beneficial?

What is the best time for pruning?

Is it profitable to the country to raise grapes for wine?

What is the best method of cultivating indoor grapes?

DISPLAY OF FRUIT.

There was a very considerable collection of fruit, principally apples, but including some nice pears and well-kept grapes, laid upon the table. The Committee on Fruits made a careful examination of them, and reported thereon to the meeting. This report will be published in the annual transactions of the Association.

The meeting broke up at a late hour of the evening.

SUMMER MEETING.

The meeting was held in the Town Hall, Guelph, on Thursday, July 4th, 1872. There was a very good attendance of members from the vicinity, besides representatives from Kingston, Toronto, Oshawa, Berlin, Ayr, Elora, Galt, London, Hamilton, Dundas, St. Catharines, Brantford, Woodstock, &c.

The first subject discussed was the

CODLIN MOTH.

Mr. Allen, of Kingston, said that much damage had been done to the apples in his vicinity by this insect, but that something had killed them off, so that they were not troubled with them now.

Mr. Morden, of Dundas, stated that in some parts of the County of Hastings there was no codlin moth. That he had noticed that the Golden Russets were not apt to be much troubled with them, not so much as the Snow apple and other more tender fleshed varieties.

Mr. Chisholm, of Halton, said that these insects were becoming more numerous and injurious in his neighbourhood.

Mr. Bennett, of Brantford, thought they were not near as troublesome this year as formerly. He believed the birds helped to destroy them, for he had found the codlin worms in the crop of the cat bird. With him the Esopus Spitzenburg and Tart Bough had been least affected.

Mr. Denton, London, believed they were worse in old than in young orchards.

Mr. Caldwell, Galt, thought that in his neighbourhood these insects had had their day, and that they were now on the decline, yet that it was very important to use every known means of lessening their numbers, such as gathering up the fallen apples, trapping and killing the insects, &c.

Mr. Anderson, of Puslinch, had a young orchard that had not yet been much troubled with these worms. With him the Snow apple had been most subject to their depredations, while he had not found any in the Duchess of Oldenburgh or the Red Astracan.

Dr. Cross, St. Catharines, remarked that though his orchard was young, yet out of some

twenty-five varieties growing in it, not one had escaped the codlin moth. Last year not one apple in ten escaped. He always picked up the fallen fruit, had used straw-ropes and killed a great many of these insects, yet there were enough that escaped to injure nearly all his apples. This pest was doing more harm than all the other insects put together.

Mr. Saunders, London, stated that a full account of the habits of this insect will be found in the Report of this Association for 1869, together with an excellent illustration showing its appearance in all its several stages of life, and the manner in which it injured our apples. He had no remedies to suggest beyond those already recommended in that report. He had found it also in the plum, thus establishing the fact that it was also in this fruit, which was not generally known.

Mr. Roy, Berlin, had found it in all varieties of apple except the Swayzie Pomme Grise. Two years ago he had not a codlin moth on his premises, but last year nearly every apple was badly injured, excepting the Swayzie. Thus far he has seen nothing of them, and thinks the fruit will not be injured by them this season. Does not believe in the efficacy of the means recommended for destroying them, but thought the only effectual way of getting rid of them was to encourage and protect the birds.

Mr. Saunders replied that he could not see how the birds could be very effectual in destroying these worms, as they spent so large a part of their life within the apple, where they were out of the sight and reach of most of our insectivorous birds. He thought it unwise to promulgate the idea that man's attempts to lessen their numbers were useless, that we ought to use the intelligence God has given us, and do all we can to prevent the undue increase of injurious insects.

Mr. Elliott, Guelph, had been a great sufferer from their depredations, not one-fourth of his apples escaping. He had been very successful in trapping them by tying pieces of old carpeting around the trunks of his trees. In these he had frequently found fifty and sixty of the larvæ at a time. He examined them as often as once in ten days. Thought he had noticed that they were more destructive in dry than wet seasons. Had noticed but very little difference in the sorts. Pomme Grise had been very bad with them, the Wagner the most exempt.

Mr. Murton, Guelph, finds the Russets and the Greenings very badly affected.

Mr. Allen, Kingston, did not agree with Mr. Roy in the opinion that birds should be protected because of their usefulness in destroying insects, for he believed they destroyed as many useful as injurious insects. At all events he urged that the present law should be so altered as to allow gentlemen to protect their own orchards from the depredations of the birds, whom he had found to be quite sufficiently discriminating in their tastes to prefer a dish of ripe fruit to the most tempting morsel in the way of a hairy caterpillar.

Mr. Benham, Guelph, remarked that he knew a gentleman who had shot as many as a hundred and fifty birds in order to save a pint of cherries.

On motion of Mr. Saunders, seconded by Mr. Morden, it was Resolved—That in the opinion of this Association it is highly necessary that some united effort should be made by fruit growers in districts where the codlin moth prevails, and would urge upon its members the use, at the proper time, of the remedies that have been suggested to lessen their numbers.

THE PEAR.

Mr. Allen, Kingston, cultivated Louise Bonne, Flemish Beauty, Belle Lucrative, Seckel and Bartlett; found the Bartlett a little tender. The Oswego Peurre did well for a time and then died from the effects of a severe winter.

Mr. Caldwell, Galt, believed the cultivation of the pear to be as easy as that of the apple, and that a timely amputation of blighting or diseased limbs would restore the tree to its usual health and vigour. The following varieties he had found to be hardy: the Bartlett, Rostizer, Flemish Beauty, Louise Bonne, Easter Beurre, White Doyenne, Sheldon, Seckel. The Seckel was very hardy in Garafraxa. Sometimes the pear tree seems to become bark-bound, and he advised the making of longitudinal incisions the entire length of the trunk of the tree, just through the bark; this will relieve the stricture, and afford room for the body of the tree to expand. Highly stimulating manures he thought injurious, and recommended the use of wood ashes and an annual washing of the body of the tree and the larger branches with soft soap.

Mr. Chisholm, Halton, grew the Bartlett, Duchess d'Angouleme, and Easter Beurre. The past winter had killed his Bartletts.

Mr. Morden, Dundas, prefers standard to dwarf pear.

Mr. Denton, London, had carted clay upon the ground where his pear trees stood—the soil was sandy—and found that the trees did not do well where the clay was put on too thick.

Mr. Lee, Guelph, found the Flemish Beauty the best variety of them all.

Mr. Fairly, Guelph, many trees suffered because they were badly planted, the soil not sufficiently broken up and pulverized; did not approve of manure for pear trees.

Mr. Phin, had a light soil and did not succeed well with pear trees.

Mr. Benham, Guelph, had been trying to grow pear trees for the last quarter of a century, lost his first trees; but for the last fifteen years had succeeded very well with dwarf trees—the reason why cultivators have not succeeded with Dwarf trees is that they have not planted them deep enough so as to have the Quince stock upon which they are worked wholly buried below the surface of the ground. The severe cold of winter frequently injures the quince stock when exposed, and hence the loss of the pear trees. The Bartlett is tender with him. Louise Bonne yields good fruit in great abundance. Howell succeeds, also Dearborn's Seedling, Seckel, Stevens Genessee, Vicar of Winkfield, and Beurre d'Anjou. Had fruited the Chaumontel.

Dr. Cross, St. Catharines, would have a poor crop of pears this year, the Duchess d'Angouleme had failed to set its fruit very frequently. Marie Louise had not failed in this way. The Duchess was the only kind that had not blighted in his grounds. His soil is clay, and he keeps it well cultivated.

Mr. Murton, Guelph, thought the soil around Guelph well adapted to the growth of the pear, although for himself he had only some half dozen varieties, and none of these had ever blossomed. Here the Bartlett, Flemish Beauty, Louise Bonne and Beurre Diel are quite hardy, and some most excellent specimens of the fruit had been shown at their exhibitions. His Beurre d'Anjou tree had blighted, though there was not as much pear blight lately as they had experienced. Large quantities of raw barnyard manure were injurious.

Mr. Elliott, Guelph, has a clay soil, which he prepared by deep cultivation, breaking it up thoroughly. As his pear trees were Dwarfs, he planted them deep enough to place all the stocks beneath the surface of the soil, and since planting mulches them thoroughly both winter and summer, using for the winter mulch suitable manure. This protects the roots from severe winter freezing, and in the summer keeps them moist and shields them from the intense heat of the sun. He prunes his pear trees in the end of summer, when the leaves begin to change, cutting the branch at some distance from the bud. This gives time for the wood to harden at the cut before the severe frosts of winter, so that the bud nearest the cut is never winter killed. He cultivates some fifteen sorts, the Bartlett, Beurre d'Anjou, Flemish Beauty, Louise Bonne, Soldat d'Esperin, which he finds to be a very fine pear, hanging well after it is set, ripening in November and December, of firm flesh and good flavour. Belle Lucrative of fine quality, but requires to be used as soon as it is ripe. Dearborn's Seedling which is quite small, ripening early, and Duchess d'Angouleme. He uses wood ashes liberally, preferring not to force the trees into a too luxuriant growth by the use of highly stimulating manures. He finds the Buffam a pear of excellent quality, and the White Doyenne is very fine, does not scab or crack, and the samples compare well with those grown elsewhere. Does not think that the winter sorts are generally worth cultivating, they have no flavor.

Mr. Roy, Berlin, found but five sorts that were reliable in his section. The Flemish Beauty was the most hardy, then the Louise Bonne, Seckel, Rostiezer, and Beurre Diel. The Beurre Diel was very hardy, and so was Elliott's Early, a variety of very good quality, about the size of Osband's Summer, and ripening before the Doyenne d'Ete, which he obtained from Mr. James Dougall, of Windsor. The Supreme de Quimper he feared was a little tender. The Ananas d'Ete was a very hardy tree, but a poor cropper. Has lost several trees of the Beurre d'Anjou during the past winter. His Easter Beurre died. The Glout Morceau is very hardy and has never blighted with him. Cannot do anything with the Duchesse d'Angouleme. The Graslin is very good and a very hardy tree; the Kingessing is tender. He advises mulching the trees, when heavily loaded with fruit, giving them a liquid manure. Cannot succeed with the Bartlett except it be double worked, he works it on the Grey Doyenne. The Beurre Giffard is tolerably hardy. Has worked the Beurre Bosc

on a variety known as Summer Rose. The Baldwin Apple when worked on the Summer Pippin does well. The Summer Pippin was brought from Pennsylvania by the Germans.

Mr. Stevenson, Guelph, has but few sorts in cultivation. Of these he places the Flemish Beauty first, for size and quality of fruit, and hardihood and productiveness of tree. Next to this he ranks the Seckel, then the Louise Bonne and the Glout Morceau. Is pleased with the Kirtland. He prunes his trees in the Spring, forming a low dense head. He has the Osband's Summer and Rostiezer, the latter a straggling grower, is on the quince stock. He prefers the pear stock. The Buffam he had fruited for three years and found it hardy, the fruit did not crack. The Belle Lucrative did very well, but was not quite as fine in flavor as he had expected, the fruit had been very uneven in size, some being of good size and other specimens very small. Does not get any fine fruit from the Duchesse d'Angouleme or the Vicar of Winkfield. The Napoleon does very well, so also does the White Doyenne, though this in some seasons cracks badly. His specimens of the Beurre Diel had not been as fine as he thought they should be, nor did he consider the tree perfectly hardy.

Mr. Alex. Glass, Guelph.—The Bartlett was tender with him, the White Doyenne did well and did not crack, the Grey Doyenne also did well. He had fruited these for five years. Osband's Summer fruits sparingly, but the quality is very fair. He finds the Bergamotte Cadette to be his heaviest cropper and hardiest tree. Stevens Genessee yields fair crops, but is badly infested with the codlin moth. The Van Beuren does not crop heavily, but the sample is good. The Vicar of Winkfield is good, the Doyenne d'Ete has fruited twice; Clapps favorite looks healthy, and so does the Glout Morceau, but these have not yet borne fruit with me.

Sheriff Davidson, Berlin.—The Duchesse d'Angouleme fruits sometimes, but not as regularly as the Flemish Beauty. His Flemish Beauty has but few specimens of fruit this year, but last year it bore a heavy crop. On the pear stock it is a very hardy tree. Osband's Summer is a fine pear and succeeds well about Berlin. The Doyenne d'Ete ripens about the middle of August, is a pretty fruit, and the tree an abundant bearer; prefers it to any other summer pear. Dearborn's Seedling bears abundantly. The Winter Nelis bears large crops every year, the tree is hardy, the fruit is not equal to the fall pears, but it is very good. The Seckel bears well, and the tree is hardy and not subject to disease. He mulches his pear trees every autumn, putting it on from six to ten inches deep. Prunes in the spring.

Mr. J. A. Wood, Guelph, prefers the Bartlett. He seldom gets any good samples of the Winter Nelis, the fruit often becoming withered on the tree. The Jaminette is a nice pear, his tree was injured some the past winter. He has also the Flemish Beauty, Swan's Orange and Beurre Hardy; the latter he finds to be a very hardy tree.

Mr. Jackson, Berlin, cultivates a few varieties, but is ignorant of the true name of many, as those he has purchased do not turn out to be what the label indicated. He has the Ananas d'Ete, which is a first rate fruit, better to his taste than the Bartlett, the Flemish Beauty lacks flavor; has also the Osband's Summer and Beurre Giffard, the latter bears well. The Clapp's Favorite does well. The Bartlett is very generally grown about Berlin and does well. Doyenne d'Hiver seems to do well, but has not yet fruited. Steven's Genessee rots at the core, but is otherwise good. The Seckel has not been a success in his hands, while the Vicar of Winkfield is bearing well.

Mr. Saunders, London, has suffered the loss of some of his trees of the Louise Bonne by reason of their breaking off at the point of union with the stock; and his Duchess d'Angouleme trees had some of them been injured by frozen sap blight.

Mr. Roy, had suffered in a like manner with the Louise Bonne, and had found the Duchess d'Angouleme very tender.

Mr. Stevenson, Guelph, had found the Bartlett very tender.

PEAR BLIGHT.

Mr. Caldwell, Galt, thinks this blight is caused by the severity of the weather.

The Secretary asked how this blight could affect seedling pear trees that had never yet seen a winter, but were nevertheless affected with this blight?

Mr. Allen enquired if the blight was bad where the land was richly manured.

Mr. Saunders replied that he thought the blight was due to certain atmospheric influences.

Mr. Stevenson had also known the young seedlings attacked by the blight before they had passed through a winter.

Col. Magill, Oshawa, remarked that the blight affected trees growing on light or heavy soils alike, that very old trees died with it, and thought that the summer had much to do with it.

The President stated that he had been informed by Mr. Bennett, of Brantford, that latterly he had been in the habit of using in dry weather a hydrant with a very fine rose, which threw the water up so that it fell upon his pear trees during the evening like a fine gentle rain, and that ever since he had adopted this plan of showering his trees they had not suffered from blight.

Mr. Hamilton, Toronto, has had those trees blight which were on light soil, but not those on heavy soil.

EVENING SESSION.

THE PLUM.

Mr. Lee, had given up the cultivation of the plum and dug up his trees in despair of ever growing any more fruit on account of the curculio.

Sheriff Davidson, Berlin, used to be troubled in the same way so that he had no plums at all, now he has plenty; he succeeded in growing plums by jarring the trees, after placing sheets under the trees, and in this way catching the curculio. He thought the Green Gage, Bleeker's Gage and the Columbia least subject to the attacks of this insect.

Mr. Allan, Kingston, adopted the same plan. He grows Coe's Golden Drop, Green Gage, Washington, Egg Plum and Damson.

Mr. Jackson finds the Lombard a desirable sort, it bore the third year after planting and is not very subject to the curculio. Prince's Yellow Gage also bears well. Common Blue Plum is very subject to black knot.

Mr. Glass, also jars the trees, and catches the curculio on sheets. He has the Bingham, the curculio is very attentive to this sort, in quality he esteems it his best; grows also the Early Orleans, Pond's Seedling, thinks the Victoria very tender and subject to the curculio; Magnum Bonum is a heavy cropper, and the fruit liable to rot in wet seasons, the tree very healthy; the Lombard is a great cropper and the best market plum; Imperial Gage is of second quality.

Mr. Roy, Berlin, finds the Victoria a tender tree, and the fruit fails to set, would not advise the cultivation of this sort, except in a specially favourable situation, when with careful cultivation the fruit will be truly magnificent. The Lombard is one of the very best croppers, yet he does not think it the most profitable variety; the Imperial Gage is more profitable. Pond's Seedling is tolerably hardy, bears good crops, and the fruit sells well. Prince's Yellow Gage does well about Berlin; Bingham is a little tender, but a showy and well flavoured fruit. The Reine Claude de Bavay ripened with him, which the President remarked was a singular circumstance, it rarely ripening at Hamilton. Was testing Oulin's Golden Grape, a new sort; thus far the tree had been perfectly hardy, but not yet fruited. The McLaughlin was a little tender. The Imperial Gage he considers the very best market plum, and well worthy of general cultivation. Lawrence's Favourite he had found to be a shy bearer and tender tree.

Mr. Jardine, Galt, cultivates the Yellow Egg and the Lombard, and believes that the curculio does not attack the Yellow Egg.

Mr. Leslie, Toronto, finds three great difficulties in the cultivation of the plum, viz:—the black knot on the tree, the curculio, and the rot in the fruit. The black knot may be kept in subjection by careful examination of the trees during the second week in July and cutting off all the affected parts; the curculio may be subdued by the diligent use of the means generally recommended, but for the rot he knew of no practical remedy. He thought the cause of the rot was of an atmospheric nature. The Lombard and Yellow Gage he placed in about equal rank. The Peach Plum does well. The Yellow Egg, Imperial Gage, Coe's Golden Drop and Reine Claude de Bavay are all good bearers.

Mr. Murton, Guelph, is successful with nearly all sorts, notwithstanding the black knot and the rot. The Bradshaw is particularly subject to the rot, yet it bears well and the tree is hardy. The Lombard is the most profitable, is a great bearer and escapes the curculio.

The Washington bears well. The black knot can be cut out in July and the wound will heal over. His favourite eating plums are the Bradshaw, Washington, and Coe's Golden Drop. The Damsons are not much affected with the curculio here, nor the Smith's Orleans.

Col. Magill, Oshawa, esteems the Old English Green Gage the finest flavoured of all plums, but it never becomes a tree, and though some of his Green Gages are thirty years old they are nothing more than mere shrubs. The Monroe Gage ripens late, and the tree is very hardy and one of the finest of all, and when young is a very heavy cropper. The Lombard is probably the best for market. Regards the Washington next in quality to the Green Gage. The late spring frosts probably have destroyed the plum crop in the neighbourhood of Oshawa this season.

Mr. Sunley, Guelph, thinks the Lawrence's Favourite the best sort he has.

Mr. Anderson stated that the Lombard, Washington and Victoria were killed by the past winter, but Prince's Yellow Gage was hardy and doing well.

Mr. Caldwell says that the Lombard and Imperial Gage are great favourites about Galt. The Duane's Purple does well there. The McLaughlin is the finest plum I have grown, but the tree is tender when young, the fruit is of fine size. The black knot is easily kept in subjection by cutting it out in the month of July. The curculio is the most destructive enemy. The rot gives us no trouble. Am sure that taking a series of years together, plum growing is a profitable business.

Mr. Hamilton, Toronto,—The black knot has destroyed nearly all the Plum trees about the City of Toronto. It is worse in trees bearing blue plums than in those of the yellow or green varieties. The Rot is worse when the weather is warm and moist.

Mr. Glass being asked to describe his new seedling plum, stated that the leaf is very thick and heavy, of a rich dark green, with a glossy shining surface. The tree a very vigorous, upright grower. Never has known a tree killed by the winter, not even the yearling buds, though they seem sometimes cut back an inch or two by the winter, the fruit sometimes is very large, weighing two and a half ounces, of a dark purple colour, with very heavy bloom. Two years ago, the parent tree bore from four to five bushels and there was not then, nor ever, any appearance of rot. It is a seedling from either Smith's Orleans or Duane's Purple. It is most like the Duane's Purple. Ripens from the 5th to the 10th of October. He asked that a Committee of the Association might be appointed to examine the plant.

Mr. James Goldie stated that Mr. Glass' seedling plum was of a very fine, showy appearance, perhaps not "best" in flavour, but promised to be a very valuable market sort.

Mr. Murton thought its showy appearance and large size would cause it to take well in market. In point of flavour he reckoned it as a second class plum.

The President and Messrs. Leslie, S. Roy, and the Secretary were appointed a Committee to examine, and report upon Mr. Glass' seedling plum.

Mr. Stevenson, Guelph, had tried a great many varieties, but had now cut them down to a very few, in truth he felt a good deal discouraged in the matter of plum growing. What with the curculio, black knot, and hard winters he had not been as successful as he would like to be. Had tried chloride of lime for the black knot but it killed the trees. The Victoria was a splendid plum, the ends of the shoots winter killed, but it does pretty well; bearing heavily for a few years, and then giving out altogether. McLaughlin does very well. The Imperial Gage is a fine plum. The Columbia is very subject to the black knot. The Lombard, Yellow Egg, and Smith's Orleans are the most profitable with him. Goliath bears a great crop, and is hardy. The curculio is not quite as bad this year as formerly. The rot seems to be infectious. Coe's Golden Drop ripens very late.

Mr. Wood cultivates the Imperial Gage, Lombard, and Coe's Golden Drop with good success.

Mr. Fairley, Guelph, thinks the Lombard to be the least subject to the curculio, and black knot, and at the same time the most prolific.

Mr. Peterson thought that the black knot made its appearance in trees growing in a poor soil, but not when the soil was in good heart. He did not think the rot to be infectious.

There not being time to discuss the subject of Strawberry culture, it was postponed to a future occasion.

The President for himself and the members from abroad, heartily thanked the Citizens of Guelph for the very kind attentions received from them, and assured them that the meeting had been very instructive and pleasant.

Mr. Peterson, seconded by Mr. Wood, tendered to the Association the thanks of the Fruit growers of Wellington and neighbouring Counties, for holding their summer meeting in Guelph, and for the many valuable suggestions and the important information disseminated through it at this meeting.

AUTUMN MEETING.

The meeting was held in Agricultural Hall, Yonge Street, Toronto, on the 9th of October. There was not as large an attendance of members as usual, owing to the holding of local fairs, yet there were present gentlemen from St. Catharines, Hamilton, Milton, Goderich, Guelph, Oshawa, &c., in addition to those from the city.

The President being absent, the meeting was called to order by the Secretary, and P. Armstrong, Esq., of Toronto, was chosen Chairman.

After reading minutes of last meeting which were approved, the Secretary read a letter from Mr. Charles Gibbs, of Montreal, relating to a contrivance for drying fruit, and laid on the table some samples of dried apples, pears and peaches, together with a photograph of a model of the drier. Mr. Gibbs stated in his letter, that it was the invention of Doctor Ryder, of Loudon, Franklin County, Pennsylvania; that exclusive of an old stove and two or three hundred bricks, the drier can be made at a cost of from \$8 to \$16, according to length, that the fruit when prepared for drying is placed in a drawer which, when filled, is put in at the lower end, so as at once to receive the greatest heat and prevent the fruit from becoming discoloured, the drawers being taken out at the upper end as they are crowded up by putting others in at the lower end; that the hot dry air which passes *through* the lower drawer, does not pass through the second, but over it and over all the rest, so that there is no steaming but only drying of fruit.

The meeting proceeded to the discussion of *Grape-growing under glass*.

Mr. John Gray, of Brockton nurseries, near Toronto, read a very interesting paper upon the subject, for which the thanks of the meeting were voted to Mr. Gray, and he was requested to furnish the Secretary with a copy in time for publication in the next annual report.

In answer to a question Mr. Gray stated, that a house for growing exotic grapes, can be put up for six dollars a foot front, with span roof, and about twenty feet in width. That the best heavy glass costs thirteen dollars per hundred feet.

Mr. Ross of Goderich, stated, that he had been recently putting up a grapery 39 feet by 19 feet, with a curvilinear rafter, that the wood work cost him \$150, the painting and glazing \$60, the glass \$54, and preparing the border between \$50 and \$60.

Mr. Gray does not recommend rough plate glass, and thinks 7 x 9, a better size to use than 8 x 10, that the glass should be bedded in putty and fastened with glazier's points, not using any putty on the out side of the glass, merely closing any crevices with a thick coat of white paint. He would make the front walls three feet high, and the building eighteen feet high in the centre. The vines when in full bearing should produce one pound of fruit to every square foot of glass, and sell readily in city markets for fifty cents per pound. In constructing a vinery, he would not advise that there should be any ventilators in the front walls at the bottom.

Second subject—*Fruit Trees in Orchard Houses*.—Mr. Gray remarked, that he would not advise that the trees should be planted in pots or tubs, but preferred them planted in the border. The roof of the orchard-house should be constructed with moveable sashes, that could be taken off entirely in mid-summer. The tress should be syringed with sulphur-water every morning. The young growth should be pinched in, and the trees planted in two rows—eight feet apart, and eight feet apart in the row. The surface of the border should be top-dressed every autumn, with about four inches of fresh turfy loam, and the use of highly stimulating manures avoided.

The Secretary called the attention of the meeting to some seedling fruits that had been placed upon the table—a new seedling plum raised by Mr. Glass, of Guelph, and several new seedling grapes raised by Mr. William Reid, of Port Dalhousie.

Mr. Glass stated that the tree from which the plums now shewn by him were taken, had been grown by him from seed: that it was a vigorous grower, held its foliage until stripped by the autumn frosts, and that it had proved to be quite hardy at Guelph

and Berlin, enduring the winters without injury ; that it was productive, bearing very large crops. The fruit ripened at Guelph by the tenth of October, and would keep for some time after being gathered. Members present expressed themselves much pleased with the appearance and flavour of the plum, and hoped that it would be disseminated and generally tested throughout the Province.

Mr. Reid explained to the meeting at some length the various parents employed by him in producing the several varieties of seedling grapes which he had placed on the table, some eight or ten in number. He gave the members present opportunity to taste each of his new seedlings, some of which were of very fine flavour and handsome appearance. The meeting seemed to be particularly pleased with one of the black and one of the red coloured seedlings. After spending considerable time in the examination of these seedling grapes, it was resolved that the thanks of the meeting be voted to Mr. Reid for bringing before us this exceedingly interesting collection of grapes raised by him from seed, and that the Secretary enter into communication with Mr. Reid with a view to his supplying the Association with vines of his most promising seedlings for distribution among the members in order that they may be tested in various parts of the Province.

Third Subject—*Varieties of Grape most likely to succeed in the latitude of Toronto and northward.*

Mr. Thomas Brownlie named Rogers No. 3 (Massasoit), and No. 9 (Lindley), the Eumelan, which ripened with him by the 15th September, the Delaware, Concord and Hartford Prolific.

Mr. Ross has found the Eumelan to ripen at Goderich by the 15th September, and the Creveling at the same time. The Rebecca does well with him. He lays all his vines down before winter, prunes them and covers them with earth. The Martha ripens with the Concord. Rogers No. 3 (Massasoit), ripens the earliest of any. Rogers No. 4 (Wilder) and 19 (Merrimac) are good.

Mr. Stevenson, of Guelph, recommends the Creveling, Hartford Prolific and Delaware. The Concord does not ripen well with him, though it does in the grounds of some of his neighbours.

Mr. Gray said that the Rogers Hybrids, Nos, 3, 4, and 15 (Agawam) 9, 19, 33, 43 (Barry) and 53, were all doing well.

Doctor Cross, of St. Catherines, remarked that the berries of the several varieties of Rogers's Hybrids were large and good, but that the bunches were very uneven in size ; that there were very few good bunches on a vine ; that on this account they were not suited for market, and about one-half as many pounds of marketable grapes could be obtained from any of them as from a vine of the same age of the Isabella or Hartford Prolific.

Mr. Ross said that the Isabella would not usually ripen in the vicinity of Goderich. That on account of the imperfect character of the bunches, the Rogers grape would not produce a crop equal to the Concord. This variety was very hardy, and bore large crops. The Isabella ripened well and produced fine bunches, but the flavour was not very good. The Iona was too late for that part of the country.

Mr. Gray said that the Catawba, Diana and Isabella did not ripen at Toronto.

Dr. Cross thought the Concord a very sure cropper, that it would bear bad usage remarkably, and ripen its fruit. The Isabella ripens well with him, yields abundantly, keeps well, and is very good. He prunes so as to have no canes older than three years, and has uniform good crops.

Mr. Brownlie discards the Iona, Diana and Rebecca ; they have not done well.

Mr. White, of Cooksville, said that in 1869 the Isabella did not ripen ; but this year it was ripe, and usually ripens well. The Catawba does not usually ripen. Had known it to ripen only in one year, and that was in 1870.

On motion, adjourned.

RADIATION AND ITS RELATION TO TREE GROWTH.

BY W. H. MILLS, HAMILTON.

Assuming that we all feel desirous to succeed in fruit growing and tree planting, not alone from a mere sense of the number of dollars which might possibly flow out of the pros.

perous issue of such undertaking, but from a far deeper and more noble sentiment ; I allude to the unconquerable love of truth, that faculty which prompts a critical investigation of the laws of matter ; it is possible that few things are more gratifying than the sense of having overcome the difficulties which beset us in our studies of the physical basis of life.

The nicely adjusted and admirably adapted instruments, however, now used in making experimental tests, enable the investigator to analyze the properties of matter with more confidence, and greater accuracy, than by any means hitherto known.

Gifted with this faculty, and in possession of these aids, he proceeds to doubt every hypothesis, for the purpose of testing its truth. I confess I hold in high esteem, a doubter who can raise cogent issues.

He is obviously no mean individual, who can thus aid in placing an hypothesis in that exact position wherein it is capable of answering correctly all questions embraced within the scope of its phenomena.

But, since I do not approach in the remotest degree to the dignity of such a position, I will humbly content myself with the use of a few facts thus evolved by others, while discussing the action of radiation, and its relations to tree growth.

Yet I certainly do not know if I should have been justified in taking up the time of this meeting in the way I am now doing, had it not been that a few days ago, I received a polite note from your Secretary, in which he said, the Directors bade me request that you would favour us, at our next meeting, with a paper upon such subjects as you may choose, relating to the objects of our Association. That appears to be the only justification. In response it may be permissible to remark, that, owing to the short time intervening between the request and this meeting, it was barely possible to do anything like the justice the subject merits : hence you are asked to receive this paper at its value.

In looking over the questions set down in the programme of to-day's proceedings, they suggested the importance of taking a view of some of the laws of evaporation and radiation, as having an important bearing on the successful pursuit of tree planting, training, and bearing.

Therefore, upon the how, and the why, it is proposed to offer a few suggestions of my own, as well as some experiments made by others ; and I think that, in the course of these observations, it will be found that radiation and evaporation are two of the most important phenomena in vegetable physiology.

The limits of this paper will prevent giving any detailed statements of some very interesting experiments, touching the facts of evaporation, and must necessarily only admit of but a few of the laws of radiation being explained.

Therefore, while an attempt is made to lay before you some of the wonderful effects of solar energy, there is no desire to claim originality. My object is rather to draw your attention to some of the more recent experiments, made in this field of scientific research, by Mayer, Tyndall, Priestley, Johnstone and others ; and to remark that :

Now and then the mental eye catches a glimpse of the Protean exhalations of water, and now and then, the shimmer and the gleam of radiant heat. But so little obtrusive are these subtle agents, moisture and heat, so obscure in their transformation into more solid trunk, limb, leaf, flower, and fruit, that one runs an extreme risk of being considered incoherent in such assertion ; and that it should give rise to an expression of wonder, is not so much a matter of surprise, since nothing appears more unlike than that subtle fluid we call aqueous vapour and the solid oak ; or the faint white glimmer of radiant heat and our much-esteemed apples and pears, notwithstanding that these same elements are convertible into such is a rigid truth.

We now possess the means of tracing out the elementary, motive force of heat and moisture in their relations to all vegetable life.

In plants, for instance, certain inorganic compounds—carbonic acid, water, and ammonia are decomposed. The carbon of the carbonic acid, the hydrogen of the water, and the nitrogen of the ammonia are retained as the constituents of the organs of plants, while the oxygen of the carbonic acid and of the water is returned as gas to the air.

Now it is observable, that when buds become developed into leaves, they are brought in contact with those inorganic compounds with which the atmosphere is at times richly freighted, and by a chemical affinity not a whit more mysterious in its operation and results, than that produced by the contact of carbonic acid, water and zinc, which precipitate a white powdery compound, do these same leaves produce a growth of limb, build up a

structure, and develop fruit out of carbonic acid and water, compounds containing carbon and hydrogen, or carbon, and the elements of water; concurrent with this process oxygen is evolved.

But you must bear in mind, the whole or any part of these objects could never be produced, were it not for solar heat, which tears asunder the molecules of the elements of plant structure, and separates them from each other, while chemical affinity stores them up into solid matter for future use.

Feeling, to a great extent, the force of this wonderful convertibility of unwholesome compounds from a condition, which in itself is unable to support animal life, to that which is its only source, I cannot restrain a feeling of gratitude for the permanency of nature's forces, in bringing about an annual cycle, whereby the delicious peach, the fragrant apple, and the aromatized pears, become evolved from carbonic acid and water. Moved by such impulse, we are impelled to say with Wordsworth, "Lo the solid ground of nature, trust the mind that builds for aye."

What an amazing transmutation of form and force solar energy presents to us, by means of our exact methods of investigation, when compared to those of only half a century ago. It is through the instrumentality of these precise ways of arriving at truth, we are brought to learn that, between the entrance and the exit of solar rays, all the multiform beauties of our globe appear.

If we set about, by aid of chemistry, tearing down the organized matters of a tree, we find it composed of fluids and gas, and a mere minimum of its bulk, solid matter.

It follows then, that the elements of water constitute a medium, the motion and the play of which require an exact observation in reading the phenomena of vegetable form and fruition.

Let us therefore endeavour to keep our minds on the action of this wonderful solar radiation, and make our observations on the effects produced by it—on the compound we call aqueous vapour; and I think it will be found, that in proportion to the obstruction opposed to radiation, or facilities afforded to its free action, as regulating the amount of water, the essential and absolute success of tree planting depends. It will indicate how high or low the head should be formed, what distances they should be planted apart, the capacity of different kinds of soil for the retention or diffusion of moisture. The correlation existing between the play of heat, soil, and atmosphere, is so intimately related, that I will here endeavour to mention some of the phenomena.

It is well known that the sun's heat passes upwards into space, at least so much of it as does not become fixed by chemical affinity; and this word radiation expresses the emission and diffusion of heat from a luminous or heated body: and since all bodies possess this power of absorption and radiation; such as our trees, soil, crops, grass; with distinct and sensible variation in their capacities; namely, the difference between gravel and sandy soils, stiff clays or porous loams, the spongy and succulent growth, and the more solid fibre of vegetable matters—hence it will not be safe to give direction, without considering these forces. Hitherto a sort of tacit consent to our neighbours' experience may be said to have stepped in to regulate our practice in planting and cultivation, which is quite true, and I may remark that in the absence of any better method, would be quite justifiable. But at the same time, it would lead us repeatedly into serious errors.

M. Becquerel says, that while examining Temperature, and its variations in trees, he discovered that straw envelopes diminished the variation in temperature, and rendered the movement of heat more regular.

It will readily be conceived that the nature and the thickness of the bark, must exert a great influence on the calorific state of trees. Experiments made on trees, show that the principle of equilibrium of temperature between the air and the trees shifts with the lapse of more or less time; and so much the more rapidly, as the variations in the air are less frequent, in winter and autumn, the difference is at a minimum, and in spring and summer, is at a maximum.

The maximum of temperature in the air takes place according to the season, between 2 and 3 o'clock, p.m., while in the tree it occurs after sunset. If regard be had to the season, it will be found that it is in summer especially that the maximum is more marked, then it does not occur until about nine o'clock in the evening.

The heat disengaged in the organs and tissues of trees interferes, but very feebly,

with their proper temperature, which is almost wholly of extrinsic derivation. For its principal cause, we must look to solar radiation, and the temperature of the air. Again, the diurnal variations of temperature in the air are easy to determine, since it is the difference between the maximum and minimum of the day. To find this variation in a tree is a matter of difficulty, but we may arrive at it, in at least an approximate manner, by the following means. Observations on temperature were made at Geneva, from 1796 to 1800, at the rising and setting of the sun, and at 2 o'clock, p.m., in the air to the north, and in the interior of a chesnut tree, 24 inches in diameter; the maxima and the minima could be obtained by combining the temperature at 2 o'clock, with that at the rising and setting of the sun, the maximum taking place about or after the setting of the sun, and the minimum at about the time of its rising, the difference obviously gives the variations within the tree. By noting the variations thus obtained in the air and in the tree, it was seen that during the years 1796-7-8 the variations were on a mean more than five times greater in the air than in the tree. In some observations made at the Jardin des Plantes from December, 1858, to July, 1859, it was ascertained that the mean of the variations of temperature in the air and in the tree, were $4^{\circ}.7$ greater in the air than in the tree, instead of $5^{\circ}.89$, as was realized at Geneva. The difference depends evidently on the bad conductability of the wood, which does not permit the variations of temperature in the air to be rapidly transmitted into the tree. It is easy to conceive that variations in the air distinctly marked, but of short duration, cannot become appreciable in the tree. These are significant facts bearing on the questions under consideration by this meeting, and in making a practical application of these experiments, it becomes obvious, that close planting, and low-branched heads, in certain localities, where it is essential to secure both heat and moisture, is physiologically indicated.

But on the other hand, it is observable that, in localities the reverse of this, both wide planting, and high-branched trees, will be placed under the most favourable condition.

The leaves and young branches of trees, and the humble plants which cover the meadows, existing under the same conditions as regards warming and cooling, produce the same effects of variation. It is in the limbs of a certain bulk, and in the trunks, therefore, that we must study the influence exerted by the proper temperature of the plant on the ambient temperature. A green stem should be considered in fact, as a body covered with an envelope possessing a great emissive and absorbent power, by virtue of which its temperature is lowered or elevated incessantly, through the effects of the radiation into space, or of the solar radiation.

But when the parenchymatous tissue is replaced by a cortical tissue, the lignum which is beneath, being humid, and a worse conductor in a transverse than in a longitudinal direction, the movement of heat is there effected very slowly, and brisk changes of temperature are no longer observed in the interior, as in the case of the young branches. From these considerations it will be seen, that the variations, being much less in the stem of a tree of a certain volume, than in the air, if the temperature of the air varies even to a wide extent, but the variations are at the same time of brief duration, the calorific state of the tree is but little affected thereby.

In the contrary case the tree finally assumes an equilibrium of temperature with the air.

Mayer says that, in consequence of the high temperature of the sun, however the atmosphere is highly diathermic to his rays, so that the latter reach the surface of our earth and warm it, the comparatively low temperature of the earth's surface is the cause why the heat cannot easily radiate back through the atmosphere into the universe. The atmosphere acts, therefore, like an envelope, which is easily pierced by the solar rays, but which offers considerable resistance to the radiant heat escaping from our earth. Its action resembles that of a valve, which allows liquid to pass freely in one, but stops the flow in an opposite direction.

The action of the atmosphere is of the greatest importance as regards climate and meteorological processes. It must raise the mean temperature of the earth's surface. After the setting of the sun, in fact in all places where his rays do not reach the surface, the temperature of the earth would soon be as low as that of the universe, if the atmosphere were removed, or if it did not exist.

Thus the configuration of the surface with an atmosphere would retard or facilitate this radiation.

'Tis further noticeable that the amount of density or thinness of aqueous vapour in the air would therefore influence temperature.

Upon these considerations it becomes obvious that our fruit trees, acting under the same laws as forest trees, in drawing off water from the earth, and discharging it into the air, are playing an important part in the economy of heat; they not only obstruct its radiation in this, but present a barrier by their power of absorption, thereby cooling the earth's surface, and facilitating evaporation. Here then exists the most intimate relation between the force of radiation, and the vital forces of our trees. Thus then the question of heat, as affected by a greater or less degree of moisture, must at all times be consulted and fully understood, to attain the best results in planting.

Mr. Brown, of the Geographical Society, thinks that temperature is not so important in the growth of trees as moisture. In this statement he must have quite lost sight of the fact that the movement of moisture is alone directed by heat. "This is the all important element," he remarks, "in the growth of forests." There can be no doubt of the truth of this expression to a certain extent, trees require at least from 15 to 16 inches of rain during the growing season. But it will be found that the relations of the soil to heat are of the utmost importance in producing fertility by radiation of moisture. In the same climate and locality we often find farmers distinguishing between cold and warm soils. The temperature of the soil varies with that of the air, to a certain depth. In summer, the temperature of the soil is higher in the day time, than that of the air. At night the temperature of the surface rapidly falls, especially when the sky is clear, and there are no tree obstructions to radiation. The nature and position of the soil must considerably influence its temperature. In short the warmth of the soil, so far as it favours vegetable growth depends upon the heat of the sun; therefore it is certain that whatever causes retardation of solar radiation back into space, must play an important part in tree growth. This really takes place, to an extent proportional to thick or thin planting, height, or lowness of the head of trees. A further observation establishes the fact that all soils, when thoroughly wet, are nearly alike in their power of absorbing and retaining heat. This is due to the fact that the capacity of water for heat is much greater than that of the soil. But since the widest difference prevails in the capacity of different kinds of soil for the retention of moisture, and since evidence has been offered to show that trees modify temperature to an important extent by means of radiation, I cannot avoid the conclusion that this society should avoid recommending a universal plan for planting, training, cultivating, &c., without first qualifying its directions by a statement of the nature of the soil, configuration of surface and the hygrometric condition of the atmosphere as affected by radiation.

It certainly would create confusion if two farmers living within a mile or two of each other, with the conditions above expressed differing widely, were both to pursue a like plan in forming the heads of their trees, planting wide or close, growing crops among their trees, one or the other must experience failure, and it might happen to both.

In conclusion, let me remark that the study of solar energy is of prime importance to the fruit grower. How to regulate and take advantage of its absolute power, as the sole and only force, that builds up and chemically combines the constituents of earth and air into tree and fruit, and let us not forget that, of the numerous wonderful properties of water, the one which it possesses, of discharging the motion of heat upwards into space, cannot be reckoned among the least important.

Professor John Tyndall, in his work on "Heat, considered as a mode of motion," gives expression to some glowing language. Speaking of the sun's energy, he says, "Every tree, plant and flower grows and flourishes by the grace and bounty of the sun; but we cannot stop at vegetable life; for this is the source mediate or immediate of all animal life. In the animal body vegetable substances are brought again into contact with their beloved oxygen, and they burn within us, as a fire burns in a grate. This is the source of all animal power, and the forces in play are the same, in kind, as those which operate in inorganic nature. In the plant the clock is wound up; in the animal it runs down. In the plant the atoms are separated; in the animal they recombine, and as surely as the force which moves a clock's hands is derived from the arm which winds up the clock, so surely is all terrestrial power drawn from the sun. He lifts the rivers and the glaciers up to the mountains, and thus the cataract and the avalanche shoot with an energy derived immediately from him. Thunder and lightning are also his transmuted strength, and remember this is not poetry, but rigid,

mechanical truth. He rears, as I have said, the whole vegetable world, and through it, the animal. The lilies of the field are his workmanship, the verdure of the meadows and the cattle upon a thousand hills. He forms the muscle, he urges the blood, he builds the brain. He not only grows the cotton, but he spins the fibre and weaves the web. His energy is poured freely into space, but our world is a halting place, where his energy is conditioned. Here the Proteus works his spells. The self-same essence takes a million shapes and hues, and finally dissolves into its primitive, and almost formless form. Presented rightly to the mind the discoveries and generalizations of modern science constitute a poem, more sublime than has ever yet been addressed to the intellect and imagination of man. The natural philosopher of to-day may dwell amid conceptions, which beggar those of Milton, so great and grand are they, that in the contemplation of them, a certain force of character is requisite to preserve us from bewilderment. All the forces of our globe are generated by a portion of the sun's energy, which does not amount to $\frac{1}{2,300,000,000}$ th of the whole," and so he goes on. But finally concludes by saying that "the law of conservation rigidly excludes, both creation and annihilation. Waves may change to ripples, and ripples to waves; magnitude may be substituted for number, and number for magnitude. Asteroids may aggregate to suns, suns may resolve themselves into floræ and faunæ; floræ and faunæ melt in air—the flux of power is eternally the same. It rolls in music through the ages, and all terrestrial energy; the manifestations of life, as well as the display of phenomena are but the modulations of its rhythm."

A FEW GENERAL STATEMENTS AND SOME DATA RESPECTING THE CLIMATIC CONDITIONS PREVALENT IN HAMILTON, ONTARIO.

By ARCHIBALD MACALLUM, M.A., HAMILTON.

When I gave something of a promise that I would read a paper at a meeting of this Association, I little thought what I was doing. I cannot describe the varieties of peaches that can be gathered from the trees for ten weeks in succession, nor the plums, rich and juicy, that maybe had, fresh from the branch, from early wheat-harvest till the frost has hardened the ground. I am among those who know very little about the thousand varieties of pear that have fruited on this continent. I am, however, a learner—a student in this great school—and it has been my privilege to receive instruction from two able and kind teachers in these matters. To yourself, Mr. President, and to W. H. Mills, Esq., I owe a debt I can never repay, but the only reward you desire is that I go on with my studies. It is plainly to be seen that fruits come in circles, with good, better and best kinds in each. Does not this grand succession of the fruits afford a beautiful illustration of the goodness of our Creator. His power, it seems to me, would be as clearly exhibited if they all ripened at once, not so the attribute to which I have referred.

And then I see in all the improvements, vast, unmeasured, though they are, that the grand principle underlying all these operations is the combined effort of man with his Maker. Of himself man cannot make a single blade of grass grow, but by putting his efforts in harmony with the laws of the Universe there seems to be no real limit to his improvements. Of my own efforts I need only say, I have tried to cultivate, and have succeeded far beyond my expectations.

The finest apple has been, I presume, thus produced from the sourest crab; the most luscious pear, peach, or plum, from some primitive type of a very low order. And besides these direct effects, the study and cultivation of nature have, in every age, been highly beneficial in elevating and expanding the mind. The physical affects the moral world—the action of the material on the immaterial, though mysterious, is reciprocal, and gives to the study of nature a peculiar charm.

Therefore, treading as it were on the confines of this interesting subject, I could give you only a fragmentary thought or detached idea, and consequently I feel a hesitancy in referring to the topics that come before us, and are so ably discussed from year to year.

But I have prepared three tables on some of the meteorological conditions of the place in which this meeting is held, the good city of Hamilton. I trust the salient points there presented will not be devoid of interest, as so very much depends upon them with

regard to the productions that may be expected from this or any other locality. The relation between the meteorological conditions of a place and the nature of its soil, and the productions thereof, vegetable and animal, are of the most intimate kind.

The importance of accurate information on these matters can hardly be over-estimated. From a paper read lately before the Canadian Institute, by Professor Kingston, it appears that in 1831 the epoch of coldest weather in Toronto was in February, and the temperature for the month was $3\frac{1}{2}$ degrees lower than in January. The epoch of coldest weather has been gradually changing, until in 1858 the temperature in January was $2\frac{1}{2}$ degrees lower than that of February. I entertain the opinion, it may be only a pleasing whim, that all these changes are subject, under fixed law, to a movement I shall denominate a precession, and that by becoming thoroughly acquainted with the laws of these phenomena, we can tell with certainty what kind of a summer we are most likely to have in the season to come, and consequently what preparations should be made to meet or take advantage of its peculiar phase in our treatment of our fruits, flowers, and fancies.

Moreover, questions of the most practical and important complexion interlace themselves with this subject. The rise and fall of our great lakes are dependent on them. At this very time, I am informed, the water in Lake Ontario is seven feet below the ordinary level in its usual conditions.

The latitude of Hamilton is $43^{\circ} 15'$ min., its longitude $79^{\circ} 57'$ min., or in time 5 hours 20 min. west of Greenwich. The height of the station where the observations were made is, above the lake 90 feet, and above the Atlantic 325 feet.

From the data herewith presented, and from others furnished by Professor Kingston in the "Year Book" for 1870, it appears that Hamilton is the warmest spot in Ontario, I believe in the whole Dominion, unless in the far West. Of all the places mentioned this city shows the highest maximum, the greatest diurnal range, and—taking 1869 and 1870 from June to May, inclusive—the greatest rainfall, though this was far exceeded in the Eastern Provinces.

The first and second tables refer exclusively to Hamilton, and the data are all derived from observations made by myself and extend over a period of six years. Table number three is a comparative one, in which other places appear, its materials have been derived from the source already mentioned.

Table No. I. contains the amount of cloudiness, mean humidity, number of rainy days, duration in hours, depths in inches; number of snowy days, duration in hours, depth in inches; total depth of rain and melted snow; wettest summer month, depth of its rain-fall, driest summer month, its depth of rain-fall; number of days from snow-fall to snow-fall, and the date of each. Ten in the column for cloudiness would indicate the whole sky to be over-cast; 100 in that for humidity, that the air was perfectly saturated with moisture, and so forth with the other items.

Table No. II.—Gives the height of the barometer reduced to 32 of temperature; the highest and lowest cases that occurred with the months of such occurrence; the mean temperature for the year, the range of temperature, the warmest month and its mean temperature; the coldest month and its mean temperature, the warmest and coldest days, with the highest degree in the former and lowest range of temperature in the latter together with the mean temperature of each; and the mean of each subject for the six years.

Table No. III.—Affords a comparative statement, embracing some ten places, of the annual temperature deduced from observations extending over at least three years, the mean annual range; the means of highest temperature; and then the temperature of each season for twelve months beginning with June 1869, and ending with May 1870; and closes with the temperature for these twelve months, and the height of each place above the level of the ocean.

The mean of the daily observations are combined during the month in finding the monthly mean; these, in their turn, are combined for the yearly, and the yearly for the period under review.

TABLE No. I.

YEARS.	Amount of Cloudiness.		Mean Humidity.		Number of Rainy Day		Duration in Hours.		Depth in Inches.		Number of Snowy Days.		Duration in Hours.		Depth in Inches.		Total Depth of Rain and Melted Snow.		Wettest Summer Month.		Depth in Inches.		Driest Summer Month.		Depth in Inches.		No. of days from snowfall to snowfall.		Last snow fell on		First snow fell on	
1871	5·7	75	79	304·30	26·34	36	137·20	52·02	31·56	August.	4·02	July.	1·34	187	1st Ap.	4th Oct.																
1870	5·8	78	107	404·05	36·51	48	303·40	121·14	48·62	July.	4·45	April.	1·61	209	5th Ap.	31st Oct.																
1869	6·3	77	99	380·13	35·20	48	276·45	85·70	43·78	June.	8·94	May.	2·06	196	13th Ap.	26th Oct.																
1868	6·0	75	89	374·15	25·45	47	256·00	65·77	32·02	{ May. } { Sept. }	4·21 4·61	July.	0·62	177	23rd Ap.	17th Oct.																
1867	6·0	76	92	336·30	21·80	65	365·35	94·82	31·29	May.	3·44	{ June } { Aug. }	0·95 0·89	194	24th Ap.	4th Nov.																
1866	5·7	77	117	684·30	34·56	44	222·50	43·97	39·13	July.	5·32	April.	1·29	207	2nd Ap.	26th Oct.																
Mean	5·9	76	97	414·00	30·00	48	260·25	77·24	37·73	.....	5·83	.....	1·46	195	.....	.....														

TABLE No. II.

YEARS.	Height of Barometer corrected to 32°.	Highest Barometer occurred in	Months.	Lowest Barometer occurred in	Months.	Mean Temperature for the Year.	Range.	Warmest Month.	Mean Temperature of the Month.	Coldest Month.	Mean Temperature of the Month.	Warmest Day.	Highest Temperature of it.	Mean Temperature of Warmest Day.	Coldest Day.	Lowest Temperature.	Mean Temperature of Coldest Day.
1871	29·6069	30·350	Jany.	28·718	Feby.	46·22	117·00	August.	70·60	Dec.	21·40	4th Aug.	99·00	81·50	21st Dec.	18·00	0·20
1870	29·5978	30·177	Jany.	28·869	Jany.	48·06	110·90	July.	72·10	Feby.	23·14	25th June.	101·80	87·00	29th Dec.	9·90	3·00
1869	29·5971	30·928	Sept.	28·800	June.	45·60	102·70	July.	68·43	March.	25·37	20th Aug.	94·30	80·70	4th Mar.	8·40	9·30
1868	29·6370	30·838	Jany.	28·873	Dec.	44·98	124·80	July.	79·99	Feby.	18·37	14th July.	106·30	88·60	3d Feby.	18·50	2·70
1867	29·6131	30·288	Dec.	28·830	Dec.	46·20	109·70	August.	71·10	Jany.	19·90	24th July.	99·80	82·80	{ 13th Jan. 12th Dec }	9·90	{ 5·30 4·80 }
1866	29·6240	30·938	Jany.	28·895	June.	45·49	115·80	July.	72·47	Jany.	22·80	16th July.	96·30	82·20	8th Jany.	19·50	1·80
Mean	29·6126	30·5865	....	28·831	...	46·09	113·49	.....	72·45	.....	21·83	.....	99·88	83·80	.....	14·03	2·95

TABLE No. III.

	Annual Temperature from observations of three or four years.	Mean Annual Range.	Mean of Highest Temperature.	1869.		1870.		For the year from June, 1869, to May, 1870.	Height above sea-level in Feet.
				Summer.	Autumn.	Winter.	Spring.		
Barrie	43·1	49·7	91·8	64·5	46·7	22·1	43·7	44·3	779
Belleville	43·6	52·9	91·3	64·3	45·9	22·5	43·4	44·0	307
Goderich...	43·9	45·0	87·2	62·2	46·2	25·5	43·3	44·2	715
Hamilton	45·6	49·6	99·2	65·5	47·4	26·4	44·1	45·9	325
Pembroke	40·1	58·5	92·3	62·7	44·0	14·9	41·5	40·8	400
Peterborough	42·3	54·2	92·9	64·4	43·9	20·6	43·4	43·1	629
Simcoe	44·8	48·6	92·0	65·5	46·8	26·9	45·9	46·3	716
Stratford			88·7	62·0	43·1	22·8	42·7	42·7	1182
Toronto	44·2	46·2		62·2	45·2	24·9	42·4	43·7	342
Windsor			94·7	67·5	47·3	27·0	47·1	47·2	620
Mean	43·4	50·6	92·2	64·1	45·6	23·4	43·7	44·2	.....

Mr. President, I have very far exceeded the limits, I had assigned to myself in this paper ; and I fear I have trespassed on your time and tried your patience—my apology is the importance of my subject which, however, is far from being exhausted. Were I not afraid I would cause some alarm, I intended to say that with your kind permission I might return on same future occasion to this or some kindred topic, but with special reference to a few of the many important lessons a knowledge of the meteorological laws of our Province is so admirably calculated to afford.

HAMILTON, February, 1872.

FRUIT GROWING IN FRONTENAC.

BY J. A. ALLEN, KINGSTON.

There is hardly any portion of Canada without its peculiar advantages of soil, climate, position, &c., and its lesser or greater countervailing disadvantages ; and if in Kingston and its neighbourhood we possess not the rich soil, milder winters and earlier springs of a large part of the great Western Peninsula, we can yet boast of THE COOLEST, HEALTHIEST, AND MOST ENJOYABLE SUMMER-CLIMATE IN AMERICA. And if our springs be somewhat late, yet when our fruit-trees come into blossom they rarely suffer by after frosts ; and if the winter be severe, yet it is steady, shielding by its snow-mantle our smaller fruits and grasses from the else too penetrating cold, and preventing to a great extent, those alternations of warm weather and hard frosts, so trying to plant life : so that, whilst here in Kingston we grow to great perfection, in the open garden, the Sweetwater Grape, yet in sunny Southern Maryland they fail to do so.

It is true, we can raise the peach only as a wall fruit, and with the aid of winter protection, and can fully ripen, only occasionally, some of the later kinds of grapes, yet are there so many varieties of the most delicious grapes that we can ripen perfectly, that we cease to be discontented.

We are still young, however, in grape-growing in this part of Canada, and only are, a few of us, feeling our way to the best mode of cultivation, and to the selection of varieties

especially suited to our soil and climate, so that whatever we write is not intended as the *dicta* of an experienced master, but rather as the words of one who tenders the best advice which his own limited experience, supplemented by that of able, earnest, thoughtful minds, can suggest.

In Kingston and its vicinity, and in the large islands adjacent, the soil is generally clay—occasionally sandy loam—overlying a Silurian limestone.

Now, I consider *clay*, especially when resting on *limestone*, the best possible foundation-soil for grapes, and these advantages are further increased by the tempering presence of a large body of water. To-day (October 23rd), my Adirondac grape vines are flourishing in almost the verdure and freshness of July, while by reference to my notes, I find that they yielded their first ripe grapes on the 5th of September, though the spring, in this part of Canada, was this year more than usually late.

Of course, in so Northern a climate, earliness in ripening is of the first importance. Accordingly, I have weeded out, and, from time to time, still continue to weed out, some varieties which, good in themselves, do not seem suitable for us. And though I still have about twenty varieties of out-door grapes—some of which are already doomed—yet are there scarcely more than half a dozen of them, which, taking all their circumstances into account, I can recommend for general cultivation *here*, and, even with respect to some of these, I cannot wholly free my mind from all misgivings. Those which, *so far*, I most approve of, are the Adirondac, Sweetwater, Hartford Prolific, Rogers No. IX. (or Lindley,) Salem, (or No. LIII,) Delaware, and though I have not fruited it myself, the Eumelan. The Salem might, *perhaps*, be dispensed with by those who have No. IX.; for I consider it quite equal to the Salem—that delicious hybrid—in flavour; while, so far as my own narrow experience reaches, it surpasses it in productiveness and early maturity. The Concord is a fine and very showy grape, but I fear hardly early enough to be depended on for a general crop, being better suited to a more Southern climate. Still, this year, it ripened perfectly, every cluster. The Ontario, a handsome grape, large in bunch and berry, but inferior in quality, is later still. Roger's IV and XV are, I fear—though I am sorry to think so—also rather late, as is likewise the Iona. Roger's III is early but not earlier than his IX, to which it is decidedly inferior. The Roger's XIX is a fine, large, black grape, ripening about the same time as the Concord. The Isabella is a fine grape in its own climate, but wholly unsuited to ours. The same remark applies to the Catawba. The Perkins, Blood's Black, Joe's Seedling, Miles and Northern Muscadine, I have already rooted out, or am about to do so. The Israella is a grape of fair quality, but, as a table grape, has nothing special to recommend it. The Creveling is a fine flavoured grape, but has a straggling bunch, owing to the fact of its setting badly. It is, too, rather late sometimes.

It seems to me of some importance that grape trellises be made to run north and south. When running east and west the earth on the north side continues damp for days after every shower, a state especially injurious to the grape vine; whereas, when the trellis stretches from north to south the vine itself, and the earth on each side of it, is visited daily by direct sunlight; and I have, I think, learned by experience that, by the observance of so seemingly trivial a circumstance, the ripening process is advanced some days.

I think it likewise important, in vineyard culture, that the land slope towards the south, and that it be thrown up into high ridges of ten or twelve—or twice or thrice that number of—feet wide, and that the vines be planted in the centre of the ridge, five or six feet from each furrow, and that the furrows be free from every impediment. Underground drains with egg-shaped tiles, the small end downwards would be a great additional improvement.

Dryness, light, and warmth seem to be the first conditions of successful grape culture. In rainless (*i.e.* in summer) California and Australia the grape vine unfolds and lifts its foliage in glossy verdure to the sun; and, like the Virginian Creeper, when plants all round are manifesting too sensibly the effects of a long continued drought, seem to exult in conditions so injurious to general vegetable life.

Now, from this circumstance, I augur the probability of success in grape growing in the neighbourhood of Kingston; for, of all parts of Canada, we suffer most here, from want of rain, while, on the other hand, the vicinity of the Lake helps to keep the air charged with in-

visible moisture, which acts as a reflector to return the heat which would else be lost to us in empty space. This vast body of water, heated during the summer by the sun's rays, and often warmer in the autumn than the surrounding air, wards off the frost by radiating its caloric into the colder strata of the air, and then prevents its escape by interposing a screen of itself, in the form of vapour, between the earth and the great heat-hungry void.

In short, could we only command a fortnight of earlier warm weather in the spring, the conditions of grape-growing would be almost perfect here. We grow the Sweetwater grape in clusters of from half a pound to a pound and a half in the open air.

Early in the season it will be well to water the young vine shoots, through the fine rose of a hydronette, with persulphide of lime, or simply to sprinkle them with *sulphur* by means of a sulphur bellows or other appliance, and to continue to do so throughout the summer, whenever the first symptoms of mildew manifest themselves.

My own practice is to prune my vines in the late autumn about ten days before covering them with earth for the winter. This dries and seals the extremities of the shoots, and thus prevent bleeding, if that be, indeed, injurious, in the spring.

If I desire much wood and foliage, I prune closely; if fruit, I leave longer shoots. In the early summer, as soon as opening buds show their embryo flowers—I break off all but those which I intend retaining for fruit, foliage, and next year's fruit canes. The best system of pruning is, I think, the alternate or the renewal; according to which the cane which bore fruit *last* year is cut off to half an inch above its 'lowest' bud, which bud is suffered to grow *this* year, to its fullest extent, without fruit, whilst a cane which had not borne fruit last year is allowed to bear fruit on *this*; and so on. But I fear that, with out-door grapes, very few observe the rule. I confess that, during the summer, I clip off with a pair of shears, too roughly and indiscriminately for the nicer requirements of science, the redundant foliage; being careful, however, to remove only the weaker growths, and the ends of shoots, but never the older leaves on the bearing canes, or on those intended for next year's fruit. The older leaves ought never to be shut out from the free air and direct sunlight by the too rank growth of newer wood. And I incline to think that the fruit-buds *for next* year's bearing would be improved by shortening the canes and their laterals about the middle of September.

With respect to manuring I cannot speak dogmatically. That all grape vines are benefited by common barnyard manure I cannot affirm; but I can say that the Sweetwater, Delaware, Adirondac and Rogers No. IX, bear well under such treatment. But as the grapevine and its products contain large quantities of potash, lime, phosphoric acid, as well as some magnesia, sulphur, iron, &c., it seems certain these must exist in the soil itself or be supplied through natural or artificial manures—either by products of the stable, &c., or by bones, ashes, gypsum, lime, superphosphate, sulphate of iron, sulphate of magnesia, &c., in at least moderate quantities, and few, I think, who have used these, will repent of having done so. But I am far from affirming that good natural soil does not contain a sufficiency of these for fair or even large crops of grapes, or that some varieties, the Concord for instance, will not give even a better return than when heavily manured from the barnyard.

But I must not quit my subject without urging the farmers and mechanics of Canada to erect, at least, some kind of cheap glass-house for the cultivation of the finer kinds of the foreign grape—the Black Hamburgh, the Muscat Hamburgh, Chasselas Musque, &c. Such a structure, capable of producing the most delicious grapes in great perfection, can, with the farmer's or mechanic's own labour, be erected at the expense of a few dollars. Three cedar posts sunk into the ground to the depth of three feet, and rising above it to the height of six or eight feet, with three shorter posts in front, six, seven or eight feet from these, and two and a half feet over ground, say—so as to give an angle of about forty-five degrees—form the skeleton of the building—twelve feet by seven, eight or nine. This is to be boarded in front, sides and rear, with common rough inch-board, with glass for the roof only. The rafters, into which the glass is to be bedded ought to be about 3 inches deep by $1\frac{1}{2}$ wide, and from eight to eleven feet long, with a door at the end nearest the back, to enable a person to walk erect. In my house, the path is sunk below the bed in which the vines are planted, which are trained on wires a foot or so below the rafters. To such a house there must be attached—in front and facing the south, *south-east* or east—a

raised bed of rich earth, well dug, manured and drained. Sods from an old pasture piled up on one another till rotted, with a moderate quantity of old manure, old lime, some sand and broken bones or bonedust, with a small quantity of wood-ashes, make an excellent bed which, with a little enriching from time to time, will last for years. If such a bed, extending eight feet in front, sixteen wide and eighteen inches inside the front boards, were under-flagged, bricked, concreted, or planked, so much the more perfect. One board fourteen inches wide, on the back of the building and near the glass, hinged on the lower side, to let down readily, will be necessary for giving air, and allowing the escape of heat. A board similarly hung in front might sometimes be found desirable. But I feel nearly certain that if the rear ventilator be left open during the day, from the time that all danger from frost has ceased, till the grapes are ripe, it will be found to be amply sufficient. Of course, after the uncovering of the vines in the spring, the back ventilator must be opened whenever the sun shines, but closed when his rays fall slantingly from the west. Such a house may, of course, be of any length and depth, according to the taste or requirements of the owner. If constructed with a longer rafter, it might have to be strengthened by a strong scantling across the centre, supported by one or more posts. Need I add how greatly such a structure would conduce to the comfort and pleasures of a tasteful family.

Before I close this article, let me suggest that a memorial of some kind being due by the public to Mr. Rogers of Salem, who originated the class of excellent and delicious grapes, which hitherto have borne his name, a small sum of money be contributed by every one who has been so signally benefited by his great achievements in successful hybridization. A few cents contributed by each person would soon amount to a considerable sum. We ought not to forget our benefactors.

I reserve my list of apples and pears, with any remarks respecting them, for a future occasion, intending before I next write to you on the subject of fruits, to observe with my own eyes, in the different districts of Frontenac, the kinds that succeed best throughout the county. I may, however, name, amongst those that are really good and appear quite hardy, the Red Astrachan, St. Lawrence, Fameuse, Northern Spy, and, above all, the Golden Russet, which every year is richly crowned with an abundant harvest of golden fruit.

Amongst Pears I may mention, as favourites, the Flemish Beauty, Louise Bonne, and, though somewhat tender, the Bartlett.

Raspberries seem to me to do best in a rich, damp, and rather shaded soil. Those to which I refer below have, none of them, received the slightest winter protection. Two kinds of white succeed pretty well; occasionally very well. I have never seen them so fine as in black vegetable mould-soil mixed with clay. Doolittle's black cap for early, and the Mammoth cluster, for late crops, have, each of them, with me, borne enormous crops; but last winter cut short and cut down some of the canes, and though I still had a good crop the Robins and some other birds left me very few of them. Growing in such large clusters and so exposed to view, they attract the attention of the whole feathered tribe, who have no conscience about reaping where they have not sown, but consider the "featherless biped," man, a great mistake in creation, and a fair subject for plunder. But, resolved, as far as black raspberries are concerned, that the Statute protected birds shall shift for themselves in the woods amongst the plants of nature's sowing, I have, this autumn, rooted every black raspberry out of my garden. Of red—indeed, of any—raspberries, the "Clarke" is my favourite. Naked before the elements it stood erect all last winter, the severest I ever remember—and came out of the ordeal, as heretofore, full of vigorous life to the very tips, and, this summer, kept on bearing for weeks its large beautiful and delicious fruit. The "Philadelphia," too, is very hardy, and a great bearer; but what compared with the "Clarke," are its small, ill-coloured, poor flavoured berries?

Of Blackberries, for *this* part of Canada, I have no good opinion. I have had the Rochelle and Kittatinny, but though I got some large berries, I never got a fair crop. They, likewise, throw up shoots in every direction, and are somewhat difficult to root out.

With the exceptions of the "Kent," cherries do not appear to succeed in this part of the country. Of plums, as of pears and apples, I purpose writing hereafter; but wish, meanwhile, to call attention to the admirable paper by J. H. Springle, on page 28 of the "Report of Fruit-growers Association," for 1871.

Currants—black, white and red—succeed to perfection here. Amongst the best vari-

eties are the black Naples, red Dutch, and white Grape currants. The Cherry, though yielding large bunches and berries, is too tender.

The gooseberry requires great care, and a rich soil. Mildew is the great difficulty. The Whitesmith is one of the best. I have some now, preserved in spirits, as large as pigeons' eggs.

We have tried several kinds of strawberries here, but I think the general opinion is that, the Wilson and Triomphe de Gand are, all things considered, the best—the Wilson for productiveness and the market : the Triomphe for the size and flavour.

ON PRACTICAL CLIMATOLOGY.

BY P. E. BUCKE, OTTAWA.

"The want of a perfect and simultaneous system of meteorological observations has long been felt by individual observers. The climatology of so vast an extent of territory must surely influence man's present happiness and future destiny ; but a perfect and unbroken cord of observations taken at the same hours has, up to the present time, not been attempted. This cannot be owing to its want of importance, for it has a direct bearing on the health of individuals, on agriculture, and on the wealth and commerce of nations."

The above remarks, written in 1866 by Arthur Harvey, Esq., for the "Year Book" of 1867, are still in force, little or nothing having yet been done by either individuals or agricultural societies to further the science in Canada. Some regrets are also expressed in the Report of the Department of Agriculture of the United States for 1870, just issued, in which the writer, André Poey, late director of the Observatory at Havana, says :—"A division of meteorology should be established in connection with the Department of Agriculture." This gentleman, in a very able and practical article, gives much useful information in a condensed form, with excellent suggestions for future observations, and regrets that although stations are established for observations under the direction of the War Department, these observations will only have a partial and indirect bearing on agriculture.

The observatories of Quebec, Montreal, and Toronto, give the state of the barometer, thermometer, rainfall, and direction of the wind, daily throughout the year, and in some other countries these observations are carried on with much more detail than here. In England, for instance, by walking into the Exchange in Liverpool, you may see the direction of the wind, the state of the weather—if cloudy, sunshine, or rainy—at fifty different points in the United Kingdom and on the continent of Europe, all telegraphed up to the latest moment. These observations are of great utility with regard to shipping and commerce ; but in a country like this, where the climate varies in every degree of latitude as well as longitude, it would be of the utmost importance to agriculture if some means could be taken to have an accurate register at least of the thermometer at all inhabited points, at distances of not more than fifty or sixty miles apart, and also of the rain and snow fall, with the date and depth of the first three falls of snow, and the number of days it covers the ground during winter. At present the only practical idea of the climatology of this country with regard to fruit culture is to be gained by carefully watching the birds which inhabit the various sections of the Province, and the date of their appearance and departure.

The writer having lived for many years near London, Ont., has noticed that many kinds of birds found there in great abundance are never met with in this vicinity (Ottawa) by any chance. Amongst these I may mention the quail, the meadow-lark (*Sturnus ludovicianus*), and the bluebird (*Sylvia sialis*). I am unable to account for the reason why the two latter do not reach this section, being birds of passage, and our summers are as genial as those further west ; but I suppose the food they prefer is not found here in sufficient quantity to entice them to our more northern region. Perhaps some of our naturalists could throw light on this subject, and I for one should take it as a great favour if the cause was made known. The insect life required for the bluebird, who feeds principally on Coleoptera caterpillars, spiders, and other insects, and ripe fruits in their sea-

son, may be extinguished by the rigour of our winters, and the small amount of cereals grown here may possibly be the reason for the non-appearance of the meadow-lark.

I am not surprised at the absence of the quail, because even as far west as the township of Warwick—thirty miles west of the city of London—these birds are frequently decimated by being smothered in the drifts which form along the snake fences. Here, where the snow lies for three months and a half on the ground every winter with the greatest regularity, they could not possibly obtain sufficient food to support life.

Prairie fowl are sometimes shot as far east as Walpole Island, on the St. Clair River, but in no other part of Canada. Again, ptarmigan, I believe, are not found to the west of Quebec. Chipmonks and red squirrels, which lay up stores for the winter, are found here in great numbers; but the black squirrel, who obtains his food from day to day in the woods, is never met with, although exceedingly plentiful in the western part of this Province, where acorns and beech-nuts, upon which he principally lives, are found in great abundance. This fact shows that our snows are too deep, and the time of their remaining on the ground of too long duration, for him to gain a livelihood. It is also found that, although we have sufficient summer heat to ripen the peach and the grape, and, I have no doubt, the fig also, our winters are so severe that, without some mode of artificial protection, these varieties of the vegetable kingdom cannot support life through it. The Lawton blackberry has not yet been successfully established, and some other plants require unusual care to keep them from being killed by frost. The apple, also, from some cause, has become a partial failure, and orchards, which are seen on nearly every farm from Bowmanville to Windsor, are rarely met with in this neighbourhood, although apples are successfully grown upon the Island of Montreal. I am not yet fully prepared to say that this is the fault of frost. I am more inclined to think that sufficient care is not bestowed upon the trees, and that they become a prey to borers and other insects; but I intend giving this subject my best attention. Although the climatic changes range from 96 degrees in the shade in summer to 40 degrees below zero in winter, and are destructive to many of the finer fruits, I am still in hopes the apple, our greatest stand-by, may yet be grown in reasonable abundance.

It does not appear that we are freed from the insect pests which prey upon the fruits of the west on account of our long cold winters. It is true we had not the Colorado potato beetle last summer, but we expect him next. We had three days and four nights last winter during which the thermometer did not at any time rise above 7 degrees below zero, and the lowest touched during that period was 37 degrees below zero. I thought this would have touched the currant-worm or saw-fly, but he appeared rather to like it, although the exceptionally cold spring made him hatch out later than usual. When he did appear, he was very persistent in his attacks, and required looking after until the end of August.

I believe, as a rule, we have more inches of frost in the ground than is found about Quebec. This is owing to the snow falling earlier there, which keeps the soil from freezing, and digging may sometimes be performed, after clearing away the snow, in the middle of winter. Some interesting experiments might be made by burying potatoes at various points in similar soils at different depths, and watching in the spring to observe the lightest covering of soil that would protect them sufficiently to enable them to sprout. Such experiments as these require co-operation throughout the Provinces.

I am now trying some experiments with the peach, the tenderest of our fruits. I have about twenty seedlings this year from the stone. I have taken up most of them, cut off the tap roots, and pruned the tops pretty severely, and laid them in a trench. In the spring I shall plant out, leading the roots in two opposite directions from the stem. Next autumn, by digging away the earth at the two sides, where no roots are planted, I expect to be able to throw the young trees over on their sides into trenches, and bury them up, having first gathered the branches close along the stem. But I do not intend to let my experiments at defeating Jack Frost rest here; I propose also growing some on the "souch," cutting off the tree a foot from the ground, and burying the branches which radiate therefrom during winter; and my third plan is to grow on the French cordon system, leading two branches eight inches from the ground along a wire. These arms may also be covered with earth, leaves, or some other protection. I am looking forward with no little interest to the report of the Fruit Growers' Association on the Eumelan

grape, which has been distributed over the greater part of Canada; here it was killed down to the snow line where unprotected. This report will give the best essay we have yet had in this country on practical climatology.

One of the main objects of climatology to the farmer, the gardener, and to the fruit-grower, is the knowledge of what fruits, grains, and vegetables may be grown with profit in a certain locality, without the trouble and loss of planting a large quantity of some valuable tree or plant, and having them destroyed by frost, heat, or wet, or some change of weather or temperature. A knowledge of this nature in the Ottawa valley would be of the greatest utility, as it is the most unfortunate place I know of with regard to its supply of fruits. There had been little or nothing done here in the way of putting out fruit trees—or if there had, they (the trees) had not succeeded—until a few years ago, when an agent came from a Rochester nursery, and a new state of things is now beginning to dawn upon us; but we are still groping in the dark, as we do not know what to plant, having to test almost everything. The agent mentioned made such a good thing of his visit, that he now regularly comes to this city two and three times a year, taking orders, supplying, and having sales; but I am informed that he is to have a rival in the shape of some nurserymen brothers, named Bailey, from Lyn or Kingston, who are going to establish themselves here in the spring. This is much desired, as plants raised on the spot, or even brought from the frontier, are more hardy than those coming from so far south as New York State. Another American agent met me a few days ago, and asked what fruits would stand this northern climate. I told him plainly that I did not know, that it depended much on the care given after planting, and a good many other things. I knew of one gentleman who had a few pears, some green gage plums, and two or three varieties of apples; another who had several trees of Fameuse; that there were also a good many varieties of grapes grown, but most of the people who had tried the finer sorts of apples and plums had failed, but from what cause I was unable to say; for, although intelligent men, when asked the cause of their failure, they were unable to give a satisfactory answer, but principally laid the fault on the climate and the borers. There are some fruits, however, that no one fails in here who cultivates them well, and this list comprises the red, white, and black currant, the American seedling gooseberry, the strawberry, the black raspberry, the crab of all kinds, and the early varieties of grapes, if the frost does not take them before ripe in the autumn. He told me he had supplied several parties with trees to test, so that he might introduce them at some future day.

I regret to say that a blight has been observed the last two years on the Transcendent Crab. It strikes the top boughs, and appears to spread downwards. It affects, as far as I have noticed, only the oldest trees; it begins to show itself at the time the fruit is about half grown, when the leaves die and the fruit shrivels. Several of my acquaintances have asked me what it is caused by, and the remedy; but I neither know the one or the other. I have advised sawing off the limbs below the part injured, but do not know if this advice has been followed, or if it has proved a check to the disease. I fancy it must be like the blight on the pears I see so much about in agricultural papers. Who can tell the cause and the cure? My trees are yet too young for it to show itself. The red and white raspberry do well when bent down, and a weight in the shape of a slab laid on them to keep the tips below the snow. Brinckle's orange stands remarkably well protected in this way, but the Philadelphia is perhaps the hardiest of the red kinds, although all do well if bent down as before stated. All the varieties of grapes require winter protection, and the best and easiest to apply is earth. This substance and snow are found to equalize climate most effectually if applied properly, and anything that can be thus protected may be grown here, if it will only ripen its wood and fruit in our short seasons.

It will be noticed that the effect of climate on plants is chiefly regulated by *temperature* and *moisture*, the amount of sun-heat and rain-fall during the *growing* season; if the plants can be kept dormant and sufficiently warm to preserve life, the rest given during winter only gives renewed and active vigour on the outbreak of spring. By actual thermometrical test, we have more sun-heat in Canada than they have in the southern parts of France, hence we ought to be able to raise here all the sub-tropical fruits if safe winter protection could be given—the true test of climatal adaptation being the ability of the plant to ripen its seeds and its young wood. Latitude does not always in

dicating temperature, and for this reason this arbitrary rule has been modified by lines called isothermal; these are drawn through points whose temperature gives the same average heat throughout the year. By looking at a chart of the temperature of the earth's surface, it will be observed that the line of perpetual frozen ground stretches across this chart in a very irregular manner, and that the part *nearest the Equator* touches the continent of America at Labrador, north of Belle Isle Straits, and from thence runs parallel to the Equator nearly as far as Quebec; it then bends gradually upwards, and on the Pacific coast it is 20 degrees, or 1,200 miles, further north than it is on the Labrador coast. Temperature is also regulated by hypsometrical or altitudinal height, as in the case of mountainous regions; but with this we have little to do in Canada, as our surface is generally flat. But lest any of my readers should have a boulder of unusual size in his town lot, perhaps it may not be uninteresting to state that a height of from 300 to 400 feet, it is estimated, makes a difference of 1° Fahrenheit. The yearly isotherm of 50° Fahrenheit passes through latitude 42° 30' in the east of America, 51° 30' in England, 47° 30' in Hungary, and 40° in Eastern Asia. It will therefore not be difficult to perceive that places having the same *mean* temperature may have a very cold winter and a very warm summer, as we have in the Ottawa valley, greater extremes being felt here than in any part of this Province; but by warding off the cold of winter by protection, and taking advantage of the great summer heat, fruits may be grown here that are cultivated in a much warmer latitude, because an artificial isotherm is thus formed. By actual experiments made in Scotland, it was found that the frost there seldom or never penetrated further than one foot into the ground, and that the mean temperature, after striking off the decimals at that depth for the succeeding months of one year, beginning with January, was 33°, 33°, 35°, 39°, 44°, 51°, 54°, 50°, 51°, 47°, 40°, and 35°. At the depth of two feet the thermometer stood the same for months at a time, and at eight feet deep the lowest marked during the year was 42°, and the highest 50°.

Some plants require a long winter of repose, and a short, hot summer; others require a dry season, followed by a wet one; whilst others again do best in a moderate temperate climate throughout the year; but it is absolutely necessary in determining the limits of the various products of the vegetable kingdom, to know the mean monthly and the mean daily temperature whilst vegetation is active, and to determine this it is necessary to know the number of days required by a plant to produce its leaves, flowers and fruits, and to estimate the mean temperature during that period.

The furthest north that vegetables are grown for food is at Hammerfest, lat. 71°; there potatoes, turnips, carrots and cabbage, succeed.

I notice in the horticultural department of *The Globe*, of the 2nd of February, speaking of the Lawver apple, the statement that "It also blooms late, and thus escapes *spring frosts*; if the tree be sufficiently hardy to endure the winter of our northern localities, this habit of blooming late will be of very decided advantage." I must inform the author of this paragraph that we have no late or "June frosts," as they are termed in the west, in this "northern locality," so that his remarks do not apply here.

OVERSTOCKING THE FRUIT MARKET.

PAPER READ BEFORE THE FRUIT GROWERS' ASSOCIATION, BY A. M. SMITH, ESQ.
LOCKPORT, N. Y.

"Is there any danger of overstocking the fruit market, or planting too many fruit trees?" is a question that is now being asked by many of our farmers and fruit growers. I recollect that twenty years ago, when a resident of Western New York, this same question was agitated there. Apples at that time were worth from 75 cents to \$1 per barrel, pears from \$2 to \$3, and farmers thought they paid well at that; but some argued that if we all planted out fruit the market would be overstocked, and they would not be worth gathering. Others thought differently, and planted largely; and what has been the result? There is now ten times the amount of fruit grown there that was grown then, and the price has more than doubled, and the demand is constantly on the increase. The

apple crop the past year in Niagara County (mostly grown in the northern part, in a territory no larger than the County of Lincoln), amounted, according to a report made at the Fruit Growers' Association of Western New York, to 300,000 barrels, at a net valuation of at least \$600,000; and the pears, peaches, and small fruits grown on the same territory would amount to at least \$150,000 more, making the income to the county for fruit alone at least three-quarters of a million of dollars, and the apple crop has been considered a light one. Sixteen years ago I consulted some of the leading farmers of Grimsby in reference to starting a nursery there, asking whether they thought it would pay or not, but received no encouragement whatever. Some said they might want a few trees to fill up vacancies in their orchards, but they did not think it would pay—there was as much fruit raised now as could be sold; and when I concluded to start on a small scale, and planted out five or six thousand trees, one old gentleman, a friend of mine, made the remark, "The boy must be crazy, he never will sell all of those trees in the world." Barrelling and shipping apples was a thing almost unknown there then; but a few years later, when buyers came in and paid good prices for fruit, people began to plant out, and the past year there have been over 3,000 barrels of apples shipped from there, worth \$6,000, and peaches, pears, and other fruits to amount to nearly as much more, to say nothing of the grapes made into wine, and from thirty to forty thousand cans of fruit put up at the Grimsby Canning Factory, and all of this grown within a territory of three miles square. I doubt if there was that amount shipped out of the Niagara district sixteen years ago. But we are asked what guarantee we have that in the future the demand will keep pace with the supply? If we have not a guarantee, we have indications that it will in several ways. We have one in the increase of the home demand for fruit, even to a greater extent than the increase of the population of our towns and cities. This is owing to the fact that people are becoming better acquainted with the nutritive and healthful properties of fruit, especially those who have emigrated here from parts where fruit is scarce, and used more as a luxury than a common article of diet. We have others in the settling-up of places in our own country, and in the neighbouring States where fruit will not grow to any extent; in the opening up of railroads and the increased facilities for transportation of fruits to different points; in the increase of the foreign demand; and in the improved quality of the fruit, particularly of our apples, which I think I may safely say can not be excelled, taking keeping qualities and everything into consideration, in the world. The apples of Western New York, particularly of Niagara and other counties bordering on Lake Ontario, have acquired the reputation of being the best keepers in the eastern markets, and generally command at least a dollar more per barrel than apples, even of the same varieties, raised either south or west. But I see no reason why the fruit on this side of the river, subject to the same climatic influences, should not be equally good; and it has been even acknowledged by some very extensive dealers to be superior. Five years ago, Curtis and Co., of Boston, bought a good many apples in the vicinity of Grimsby, and at the same time were buying extensively in Western New York; and Mr. Curtis informed me that the finest fruit he got that season grew between the mountain and lake in that section. Last fall I sold to a firm in New York 1,300 barrels of apples that I bought in the township of Stamford, near Niagara Falls. This firm also bought a good many at Lockport and other places in Western New York—and after they were inspected by one of the firm, I received the following compliment to Canadian apples:—"I am much pleased with the apples bought by you, and would not exchange them for any other 1,300 between Niagara River and New York City." I thought it was a pretty good one, seeing that there was at that time over half a million barrels between the two points. There may be a danger of overstocking the markets with some of our small fruits. I have known instances of it in some places on the other side, but I do not apprehend anything of the kind here, particularly in the neighbourhood of any of our large towns, or the Grimsby Canning Factory. And here I believe is another indication of the increased demand for fruits: in the various new ways of preserving them—canning, drying, and the retarding processes, which are practised in a great many places in the United States, and which will, I am confident, ere long, be adopted on a large scale here. Of peaches and pears, and the finer varieties of cherries, I think there is no danger of overstocking the market: for the colder portions of our country, where they will not grow, are able to consume all the surplus

that can be grown in the favoured localities where they do succeed ; but there is more care needed in the selection of varieties of fruit. It is a lamentable fact that one half of the apples grown in Canada are varieties that are worth very little, only for cider. Farmers have taken very little pains to inform themselves in regard to the varieties best adapted for marketing and to the climate, and there are thousands of orchards of natural fruit, which, if they had been grafted to the right kinds, would now be yielding thousands of dollars to their owners. But I am glad to see that they are beginning to wake up to the importance of this subject, and I believe the day is not far distant when Western Ontario will become what it should be—one of the best fruit-producing sections of the world.

ATTEMPTS AT FRUIT RAISING IN THE BACKWOODS.

BY JOHN WATSON, BIRKHALL.

Having some time ago promised the Secretary of the F. G. Association to write something about my failures and successes as a backwoods farmer at fruit growing, I do so with a very great degree of diffidence, and more with the desire to fulfil that promise, than supposing that I can write anything to interest, far less to instruct, others, inasmuch as my experience in that line only extends over a period of eight or nine years.

Allow me to premise my remarks by stating 'at Bear Creek, on the banks of which I am settled, in the Township of Moore, like the stream described in the "Cottagers of Glenburnie," has a trick of running out of the straight line, and delights in forming oxbows, angles, and corners, in its tortuous course through the Townships of Warwick, Enniskillin, Moore, and Sombra. Before the discovery and development of the oil business in Enniskillen, the fertility of its flats was such that twenty and thirty successive crops have been raised without the assistance of any other manure than the alluvial deposits left each spring by floods. Its waters have now become so much impregnated with the refuse from the oil refineries of Petrolia, and other deleterious matters, that anything of a vegetable or animal nature cannot live and thrive well that is much in contact with them, which almost renders the flats useless for cultivation. Doubts being entertained whether any real remedy can be devised for this much-felt grievance, it may be a question worthy of consideration whether settlers could not in some measure compensate for this drawback by taking advantage of its cultivateable slopes and banks for fruit growing. These banks generally follow the zig-zag course of the stream, and furnish almost any exposure that may be desired for fruit trees.

The luxuriance with which vegetation flourishes in its vicinity, and the success that has attended the efforts of some settlers who devoted a little attention to horticulture, afford good grounds for supposing that fruit may be profitably raised at Bear Creek, notwithstanding the blossoms being sometimes blighted by spring and summer frosts.

Improvements in any branch of industry being usually brought about by experiments, often accompanied by failures, I beg to give a few facts respecting my attempts at fruit growing in this section.

In the fall of 1863, I settled on a bush lot. The soil a stiff clay. A small tributary of Bear Creek runs through the centre, affording excellent facilities for draining. A space was chopped and cleared for a house on the banks. The next undertaking, after the erection of the log house, was to plant some fruit trees.

The declivity of the banks was sufficient to prevent the retention of much stagnant water in the soil ; but, to prevent the possibility of any remaining about the trees, large holes were dug, and some oak stave hearts put in the bottoms, with an eye at the lowest side for the escape of water, should any accumulate.

The idea of planting fruit trees among roots, stumps, logs, and log piles, was laughed at as utopian by some of my neighbours. It, however, required no great knowledge of agricultural chemistry and vegetable physiology, to perceive that the ingredients essential for plant food were in abundance. The large quantities of leaves decaying and decayed, showed a sufficiency of organic matter for some years to come ; whilst the piles of ashes, from the trunks of the giant elm, beach, and maple trees that occupied the ground for

centuries as a previous crop, were enough to satisfy the desires of the most fastidious arboriculturist in favour of alkaline manures.

Apple and plum trees were carefully planted, and grew beautifully. The apple trees will now compare favourably with any in the neighbourhood, planted at the same time. Taking into account our short springs and the large amount of work to be performed, possibly the fall is the more convenient season for farmers to plant trees. The trees are established and ready to start into growth as soon as the two great agents of vegetation, heat and moisture, are sufficient in the soil.

The Red Astrachans, Golden Russets, and Baldwins bore well in 1870, and the Fall Pippins and Duchess of Oldenburg, or a tree resembling the latter, last year. Fruit, both in size and flavour, all that could be desired.

The Northern Spys and Winter Greenings are thrifty, but the former throw out such a profusion of top growth every year as to require the constant use of the pruning knife to keep the centres open.

Although one tree bore a few last year, I am inclined to believe that the new settler that plants an orchard of Spys must console himself with the poet's advice, and "learn to labour and to wait" for fruit. If it be true that vigilance is the price of liberty, not less true is it that crops of good fruit can only be secured by constant watchfulness on the part of the fruit grower.

Two years ago the borers got into the Red Astrachans. Not willing to disfigure the trees by cutting the invaders out, I resolved to try other remedies. A writer on the subject recommended the stopping up of the holes by which they entered with sulphur. To make security doubly secure, I mixed the sulphur with lard and phosphorus, and closed the holes behind them.

To all appearance the depredators were now as securely shut in as Bazaine was in Metz by the Prussians. Alas for the best laid schemes! Sulphur and phosphorus had no more effect on *chrysobothris femorata* than Port wine and water on an opium eater. As soon as they finished their engineering operations by boring and tunnelling in the heart of the trees, they made their exit by a more direct route than they entered, as if they used the phosphorus to light their way.

The trees kept growing, and are recovering, but had to be propped for fear of high winds. Last year the Russets were attacked. Instead of trusting to nostrums, the borers were unceremoniously dug out with a sharp pointed knife.

As working and waiting are man's duty, and thrifty toil the one condition of true thriving, a little well-directed labour, if it will not prevent the attacks of these pests, will in some measure make them less frequent. The lye from a few barrels of wood ashes, mixed with some soft soap, will be sufficient to wash a good many trees two or three times in a season.

Plum trees were planted, in the same manner as the apples, in the face of a bank with an eastern exposure. They grew from two to four feet each year. After three or four years, symptoms of decay appeared in one after the other, until all died. Some died on one side, others all round; whilst the bark on others died in spiral stripes, like the thread of an augur. It appeared as if the sap in early spring were started by the warm sun shining full upon them in the forenoon, and sharp frosts succeeding at night, froze the sap at or near the surface of the ground. The trees when broken were black in the heart. Some of the plants were suckers taken from the roots of other trees, others were not; and whether this had anything to do with their early decay I know not.

In backward seasons, I have noticed in exposed situations in the elevated districts of Aberdeenshire, Scotland, where alone the hardy Scotch fir and the birch can brave the height and the cold, sap frozen as described. In the case of the pines, small protuberances were formed round the trees at the parts frozen, and the sap exuded through the bark adhering to the outside in the shape of resin. These trees appeared stunted in growth afterwards, but they had stamina enough to struggle for life; whereas the plums, forced, it may be, too much in summer, succumbed to the sudden changes of temperature.

A yellow Siberian crab tree, which was planted in the same bank four years ago, and probably stimulated too much by the droppings of fowls applied once or twice, grew admirably, and bore fruit the last two years. Early last harvest, the leaves began to fade

and fall off. On examination, the bark was found dead under the surface of the ground. It was scraped off, and the part rolled in a mixture of cow manure and clay. Should it die this year, which is very likely, it is another lesson that trees may be killed by kindness as well as by neglect.

Peaches were, at one time, grown in great quantities in this settlement; but, of late years, few can be raised, and little attention is paid to the cultivation of them in consequence. There is no evidence to show that the failure is occasioned by the change of the seasons, and must be accounted for in some other way.

EXPERIMENTS IN HYBRIDIZING.

BY W. SAUNDERS, LONDON, ONTARIO.

The term hybridizing in its proper signification is usually restricted in its application to the crossing of distinct species, but it has been customary when speaking of fruit-bearing trees and plants to use this term in a wider sense, embracing sometimes crosses between varieties of the same species as well as those of dissimilar ones, and in this way I shall feel at liberty to use it throughout this paper without further remark.

PREPARATION AND PRECAUTIONS.

Since the results of hybridizing depend so much on the care taken in conducting the operation, I shall detail here the precautions I have adopted throughout these experiments. The flower buds to be worked on having been selected, all those which show any sign of bursting are rejected as well as such as are not sufficiently developed, aiming always to get as many flower buds as possible, which are so far matured as to be nearly ready to open. Being provided with a pair of fine pointed forceps, a few camel hair pencils, and some paper bags large enough to enclose the branches on which the blossoms about to be worked are situated, everything is ready. With the fine forceps the envelopes of the flower—the calyx and corolla—are to be carefully removed without bruising the internal organs, when the sexual parts the stamens and pistil or pistils will be exposed to view; the stamens or male organs are next torn away, leaving the female organs free from all surroundings. Having operated on all that may have been selected in the bunch in this way, the whole is at once tied up in a paper bag, thus preventing the possibility of any insects visiting it afterwards, or any extraneous pollen being carried to it by the agency of winds.

The probability of insects visiting any flowers which have been deprived of their calyx and corolla is not very great, as these parts seem necessary to attract their attention. I have several times prepared bunches of raspberry flowers in this way and watched them to see if insects would visit such, and have never seen them doing so, or ever found any of the flowers so exposed to be impregnated. It is well, however, to take every precaution to gain the results aimed at and this measure should never be neglected.

COLLECTING AND APPLYING THE POLLEN.

The pollen or fertilizing powder is now to be collected from the variety you wish to impregnate with, and brought and applied to the pistils enclosed within the paper bag, with some fruits this is much easier done than with others, as the pollen is more abundant. The blossoms of the grape for example yield it very plentifully, so much so that a slight jar given to a vine in bloom will cause the fertilizing dust to arise like a small cloud from every bunch of blossom. In the morning just as soon as the dew is off the foliage, provided the day is fine and warm, is the best time for collecting the pollen as it is then that the most abundant supply is to be obtained; and it is wisely arranged that it should be so. Any one who has paid much attention to insects will know that the great bulk of the day flying species are most incessantly active during this period of the day, and they are the great agents employed by nature in effecting fertilization; for passing as they do from flower to flower to gather the sweets there contained they knock the anthers containing the pollen about the stigma and un-

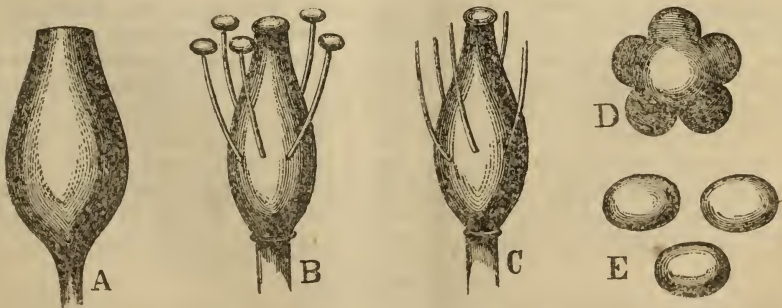
consciously gather other portions of the fertilizing dust about their legs and wings and carry it from one flower to another. The amount of fruit set every season largely depends on the character of the weather at the time of blossoming ; if it be fine and warm so that insects can be active, the probabilities of a good crop are much greater than if the weather be cold and damp.

Pollen may be collected from the grape blossoms by holding under the bunches, a piece of blue paper, and by a sharp tap with the finger jarring that portion of the branch, when a fine cloud of pollen dust will be liberated, and gradually settle on the paper below. The caps of the flowers will also fall plentifully at the same time, and will require to be carefully removed when the fine yellow powder may be distinctly seen on the blue paper. By repeating the operation a few times on different blossom bunches the quantity may be much increased and enough collected to transfer to a small tube or phial in which it may be preserved for future use ; or it may be folded up in the blue paper in which it is collected, due care being taken to label the pollen of the different varieties. Pollen may also be collected directly from the flowers with a camel hair pencil slightly moistened, the pollen dust adheres readily to the moistened surface which is soon coloured with it ; this requires to be transferred to the flowers it is intended to influence without much delay, otherwise as the moisture on the brush dries, much of the material will fall from it and cannot be recovered. I have also found the fingers very useful in this way ; there is usually enough moisture on the skin to detach the pollen masses from the flowers and secure their adhesion, and thus small quantities may be more readily seen and conveyed than in any other manner I know of. These two latter methods are applicable also to the flowers of the apple, pear, plum, cherry, strawberry and gooseberry where the pollen could not easily be collected by the jarring process.

In some cases such as the raspberry and blackberry, I have found it better to break off the expanded flowers, instead of gathering the pollen ; and having removed the outer envelopes and also the central female organs, carry the mutilated flowers, on which the fringe of male organs alone remains, and twirl those organs about among the many pistils in the previously prepared flowers ; this method may also be adopted with the fruits last named.

The proper time for applying the pollen will depend chiefly on the maturity of the flowers. If they were nearly matured at the time the envelopes were removed, the pollen may be applied the same day, or the day following, the aspect of the weather and the convenience of the operator being his guide. Pollen grains retain their activity for a considerable length of time ; so, if the weather is threatening or if there is a likelihood of other engagements preventing its use the following day, the first application may be made at once, and repeated in two or three days afterwards ; this second application increases the chances of success and should not be neglected. In no case should the flowers be left for a moment uncovered unless under the eye of the operator, and should he have to go for a second supply of pollen, the covering bags should be used during his absence, otherwise some wandering insect may perchance alight on the prepared blossoms, and carry to it the pollen from some other flower and thus vitiate all his results.

For the benefit of those who may have given no attention to the study of the organs of the flower, I cannot do better here than reproduce a figure which appeared in the report of last year, as illustrating the hybridizing of the grape, and subjoin an explanatory paragraph, which will, I trust, enable all to understand the matter clearly.



"In the accompanying figure, A. represents one of the unopened flowers of the grape on an enlarged scale. As this approaches maturity its covering is gradually ruptured and turn

a little upwards, and in a short time the cap is raised until it sits loosely over the tops of the stamens, and then soon falls to the ground, appearing as represented at D, when the stamens, released from the bond which kept them together, separate with an elastic spring and appear as shown at B. The body of B is the female organ and is called the pistil, the lower portion is named the ovary, and contains the ovules or immature seeds, while the summit or crowning top is called the stigma. The stamens, five in number springing from and surrounding the pistil, are the male organs, the knobs on their tops are called anthers, and contain the fertilizing pollen. This pollen when mature causes the anthers to open, and their contents consisting of almost innumerable grains are shed gradually. The pollen grains are shown at E, immensely magnified. When the stigma is fit for fertilization it exudes a gummy fluid to which the pollen grains readily adhere, and the stamens with their anthers so encircle it, that no matter how the flower may be situated on the bunch, one or more of the anthers will be found directly over it, so that it can scarcely fail to become fertilized, when pollen grains are continually falling from above and around it, and while insects are ever busy in travelling from flower to flower, and knocking the anthers about the stigma with their legs and wings. After the pollen grain has become attached to the stigma it begins to absorb some of the moisture it finds there, and a process of growth or germination begins, when the pollen sends out a minute fibre or thread which penetrates the substance of the stigma, and then goes on lengthening downwards until it reaches the embryo seed contained in the ovarian cavity, which it enters and fertilizes."

Paper bags are recommended for covering the flowers which have been prepared for artificial impregnation, on account of the closeness of texture of the material of which they are made, for the pollen grains, which are sometimes blown about by the wind, are so exceedingly minute that they would pass readily through the meshes of the finest muslin. Hence paper bags should be used until the fruit has set, and is thus beyond the possibility of further influence, and then the close paper bag should be replaced by one of coarse muslin, which will freely admit the light and air, so essential to the healthy growth of the fruit.

For five years past, I have been working more or less in this interesting field, and have experienced some successes and many failures. I now propose to detail these operations, beginning with 1868, and ending with 1872, taking the different fruits in order separately. In reference to the work done in 1868, I would say, that during that season I did not use the paper bags, but used those made of muslin from the first, believing that there was not much danger from outside influences, through the medium of the atmosphere, and provision was thus made only against the interference of insects. That season I was visited by my esteemed friend, Mr. W. H. Mills, of Hamilton, who I found had been working for a year or two previous, very carefully, in this same department, and he suggested to me the use of paper bags, which, since that time, I have invariably employed. Knowing that this omission on my part would cast a doubt over the results of my operations for that year, I was anxious, if possible, to estimate the probabilities of fertilization from the agency of the atmosphere alone, and for this purpose instituted the following experiment:—Two bunches of Concord blossoms were selected and prepared, by removing their envelopes and male organs, and each was enclosed in a coarse muslin bag. One of these was situated only about three or four inches from another bunch in full blossom, yet it failed to set a single berry. The second bunch occupied a position just under several bunches of expanded flowers, and was thus most favourably placed to receive influence from the descending pollen. This bunch was divided into two portions, the shoulders forming one part, the tip the other, the intermediate flower buds being removed; the tip which was furthest from the other flower bunches was artificially fertilized by pollen from *Lady Downs*, and set nine berries; the under part of the shoulders failed to set anything, and on the upper part, almost immediately under the other blossoms, there were only three berries set. As I had made it a rule to select the flower bunches operated on, so as to have them as far away as possible from others, I was satisfied from the results of this experiment that there was not much probability that my hybrid seeds for that year had been at all influenced by pollen conveyed through the atmosphere.

THE GOOSEBERRY

In 1868 the following crosses were made:—

1. Houghton's Seedling *female* with Warrington *male*; six berries matured, the seeds from which produced nineteen plants the following spring.

2. Houghton's Seedling *female* with Roaring Lion *male* ; two berries matured, the seeds from which produced eighteen plants.

3. Houghton's Seedling *female* with Whitesmith *male* ; one berry matured, from which only two plants were obtained, one of which died before coming into second leaf.

4. Houghton's Seedling *female* with Ashton's Seedling *male* ; one berry matured, from which one plant only was produced.

5. Houghton's Seedling *female* with Broom Girl *male* ; five berries matured, but none of the seeds germinated.

6. Houghton's Seedling *female* with Crown Bob *male* ; no berries set. From six to ten flowers were operated on in each of these experiments.

1870.

7. Houghton's Seedling *female* with Whitesmith *male* ; one berry matured, from which five plants were obtained in spring of 1871, two of which died while quite young.

8. Tried to cross the wild thornless gooseberry (*Ribes hirtellum*) with Roaring Lion and Whitesmith, but failed to obtain any result.

1871.

9. Houghton's Seedling *female* with Whitesmith *male* ; operated on six flowers, two berries matured, the seeds from which produced twenty-two plants.

10. Houghton's Seedling *female* with Ashton's Seedling *male* ; two berries matured, which also produced twenty-two plants.

11. Houghton's Seedling *female* with Broom Girl *male* ; five berries matured, producing thirty-three plants.

12. Houghton's Seedling *female* with Warrington *male* ; failed.

13. Houghton's Seedling *female* with Roaring Lion *male* ; failed.

14. Downing's Seedling (white) *female* with Roaring Lion *male* ; operated on five flowers, one berry matured, the seeds from which produced twelve plants.

15. Downing's Seedling *female* with Warrington *male* ; failed.

16. Downing's Seedling *female* with Whitesmith *male* ; operated on five flowers ; failed.

17. Downing's Seedling *female* with Ashton's Seedling *male* ; operated on three flowers ; failed.

18. Wild thornless gooseberry (*Ribes hirtellum*) *female* with Roaring Lion *male* ; operated on ten flowers, one berry matured, the seeds from which produced sixteen plants.

19. Wild thornless gooseberry *female* with Warrington *male* ; operated on four flowers ; failed.

20. Wild thornless gooseberry *female* with Ashton's Seedling *male* ; failed.

21. Wild thornless gooseberry *female* with Whitesmith *male* ; operated on eleven flowers ; all failed.

1872.

22. Downing's Seedling *female* with Whitesmith *male* ; failed.

23. Downing's Seedling *female* with Warrington *male* ; failed.

24. Downing's Seedling *female* with Ashton's Seedling *male* ; one well-ripened berry was gathered.

25. Wild prickly gooseberry (*Ribes cynosbati*) *female* with Warrington *male* ; failed.

26. Wild prickly gooseberry *female* with Ashton's Seedling *male* ; two berries set, but did not ripen well.

27. Wild prickly gooseberry *female* with Roaring Lion *male* ; operated on eleven flowers ; failed.

28. Wild prickly gooseberry *female* with Downing's Seedling *male* ; two berries set, but did not ripen well.

The seeds resulting from these latter crosses (1872) were sown on the 31st of July, and will not germinate until next spring.

THE GRAPE.

1868.

1. Clinton *female* with Syrian *male*; eighteen berries ripened, yielding thirty-five seeds, which produced nineteen plants.

2. Clinton *female* with Muscat Hamburg *male*; two bunches of flowers were operated on, one berry only set, which was accidentally broken off before it matured.

3. Clinton *female* with Muscat D'Aout *male*; eight berries ripened, yielding thirteen seeds, which produced ten plants.

4. Clinton *female* with Black Hamburg *male*; five berries ripened, yielding nine seeds, which produced eight plants.

5. Clinton *female* with Victoria Hamburg *male*; nineteen berries ripened, yielding twenty-eight seeds, which produced fourteen plants.

6. Clinton *female* with Grizzly Frontignan *male*; failed.

7. Clinton *female* with Chasselas Musque *male*; five berries matured, yielding seven seeds, which produced two plants.

8. Clinton *female* with Royal Muscadine *male*; twenty-two berries matured, yielding forty-one seeds, which produced twenty-five plants.

9. Clinton *female* with Black Frontignan *male*; failed.

10. Clinton *female* with Rose Chasselas *male*; thirteen berries set, only a part of which ripened, yielding seven seeds, which produced four plants.

11. Clinton *female* with Buckland's Sweetwater *male*; thirty-three berries set, most of which matured, yielding forty-five seeds, which produced twenty-four plants.

A part of these seeds were sown in the fall, the remainder in the spring; the former germinated a few days earlier than the latter.

1869.

During this season my operations were mainly directed to obtaining crosses between a chance seedling, which was fruiting for the second time in my garden, and the European varieties. This seedling, which first fruited in 1868, although much smaller in berry and bunch than Clinton, was finer in flavour, and ripened a few days earlier, and at the same time proved equally hardy, vigorous and prolific.

12. Seedling *female* with Muscat Hamburg *male*; six berries ripened, the seeds from which produced five plants.

13. Seedling, *female* with Duchess Buccleuch *male*; ten berries ripened, the seeds from which produced ten plants.

14. Seedling, *female* with Buckland's Sweetwater *male*; four berries ripened, the seeds from which produced four plants.

15. Seedling, *female* with Muscat Otonell *male*; nine berries ripened, the seeds of which produced eighteen plants.

16. Seedling, *female* with Black Frontignan *male*; twenty-eight berries set, most of which ripened: seed produced twenty-nine plants.

17. Seedling, *female* with Grizzly Frontignan *male*; nine berries ripened, the seed of which produced eight plants.

18. Seedling, *female* with Victoria Hamburg *male*; fifteen berries set, some of which ripened, yielding seeds which produced six plants.

19. Seedling, *female* with Chasselas Musque *male*; three berries set, but during the summer the branch on which they were growing was accidentally broken off, so they failed to ripen.

20. Seedling, *female* with Lady Downes *male*; ten berries ripened, the seeds from which produced seventeen plants, only five of which survived the first season.

I tried to cross Clinton with six different foreign varieties, but succeeded with only two—one with Muscat Hamburg, four berries set; the other with Lady Downes, three berries set, but these unfortunately came to an untimely end, being accidentally destroyed before they were ripe. I also tried Delaware with six varieties of foreign grapes; Rogers No. 4 with one: Rogers No. 3 with two, and Concord with four varieties, but in every instance failed. Rarely have I had so little success as during that season.*

1870.

21. Seedling, *female* with Muscat d'Aout *male*; seven berries ripened, yielding nineteen seeds, which produced fourteen plants.

22. Seedling, *female* with Chasselas Musque *male*; six berries ripened, yielding thirteen seeds, which produced nine plants.

Tried to cross Hartford Prolific with Syrian, Chasselas Musque, Black Hamburg, and Muscat Hamburg, but they all failed.

23. Clinton *female* with Duchess Buccleuch *male*; twelve berries set, but before they were half ripe the branch on which they were growing was broken off by a strong wind.

24. Clinton *female* with Muscat Hamburg *male*; fourteen berries ripened, yielding nineteen seeds, which produced twelve plants.

25. Clinton *female* with Muscat Otonell *male*; four berries from this cross had nearly reached full size, when they were destroyed in like manner with (23).

26. Clinton *female* with Grizzly Frontignan *male*; twenty berries set, but this branch was also broken by high winds.

27. Clinton *female* with Chasselas Musque *male*; fifteen berries set, but the branch was broken by falling of trellis, from high winds.

28. Clinton *female* with Buckland's Sweetwater *male*; twelve berries set and were nearly full grown when they were destroyed with (27).

29. Clinton *female* with Duchess Buccleuch *male*; fourteen berries set, which were also destroyed by the same accident.

30. Clinton *female* with Syrian *male*; five berries grew to full size, but did not ripen well. They yielded eight seeds, which produced two plants.

31. Concord *female* with Duchess Buccleuch *male*; fourteen berries set, but did not ripen well, yielded sixteen seeds, ten of which were soft and immature: produced four plants.

32. Concord *female* with Syrian *male*; seven berries set and attained full size, but did not ripen well; yielded ten unripe seeds, none of which germinated.

33. Concord *female* with Muscat Hamburg *male*; failed.

34. Concord *female* with Buckland's Sweetwater *male*; three berries reached full growth, but did not ripen well; yielded four seeds, none of which germinated.

35. Delaware *female* with Chasselas Musque *male*; one berry ripened, yielding one seed, which produced one plant.

36. Delaware *female* with Black Hamburg *male*; failed.

37. Delaware *female* with Muscat Otonell *male*; failed.

38. Delaware *female* with Muscat Hamburg *male*; seventeen berries ripened, yielding twenty seeds, which produced seventeen plants.

39. Delaware *female* with Black Frontignan *male*; failed.

40. Delaware *female* with Buckland's Sweetwater *male*; failed.

41. Delaware *female* with Victoria Hamburg *male*; four berries ripened, yielding four seeds, which produced two plants.

1871.

42. Clinton *female* with Black Hamburg *male*; three berries set but did not ripen well, yielded five seeds, none of which germinated.

43. Clinton *female* with Rose Chasselas *male*; failed.

44. Clinton *female* with Golden Chasselas *male*; nine berries ripened, yielding seventeen seeds, which produced four plants.

45. Clinton *female* with Duchess Buccleuch *male*; thirteen berries ripened, yielding twenty-nine seeds, which produced twenty-two plants.

46. Clinton *female* with Syrian *male*; eight berries ripened, yielding sixteen seeds from which were obtained six plants.

47. Clinton, *female* with Buckland's Sweetwater *male*; eleven berries ripened, which yielded eighteen seeds, most of which were immature—none of them grew.

48. Clinton *female* with Royal Muscadine *male*; failed.

49. Clinton *female* with Muscat Hamburg *male*; ripened ten berries, which yielded twenty-nine seeds, from which were obtained six plants.

50. Clinton *female* with Victoria Hamburg male ; failed.
 51. Clinton *female* with Muscat Otonell male ; ten berries ripened, yielding twenty-two seeds, which produced eleven plants.
 52. Clinton *female* with Ingram's Hardy Muscat male ; failed.
 53. Clinton *female* with Lady Downes male ; failed.
 54. Clinton *female* with Delaware male ; failed.
 55. Clinton *female* with Rogers 4 male ; four berries ripened, containing seven seeds, which yielded one plant.
 56. Seedling, *female* with Black Hamburg male ; seventeen berries ripened, containing twenty-nine seeds, which yielded eighteen plants.
 57. Seedling, *female* with Royal Muscadine male ; ten berries* ripened, containing twenty-five seeds, which produced seven plants.
 58. Seedling, *female* with Ingram's Hardy Muscat male ; nineteen berries ripened, containing fifty-nine seeds, which produced thirty-eight plants.
 59. Delaware *female* with Muscat Otonell male ; nine berries ripened, which yielded twelve seeds, none of which germinated.
 60. Delaware *female* with Royal Muscadine male ; failed.
 61. Delaware *female* with Syrian male ; seventeen berries ripened, containing twenty-two seeds, which yielded three plants.
 62. Delaware *female* with Duchess Buccleuch male ; twenty-eight berries ripened, containing forty four seeds, which produced twenty-two plants.
 63. Delaware *female* with Lady Downes male ; failed.
 64. Delaware *female* with Black Hamburg male ; failed.
 65. Delaware *female* with Ingram's Hardy Muscat male ; failed.
 66. Delaware *female* with Chasselas Musque male ; ten berries ripened, containing nineteen seeds, which yielded three plants.
 67. Delaware *female* with Grizzly Frontignan male ; failed.
 68. Delaware *female* with Buckland's Sweetwater male ; failed.
 69. Delaware *female* with Diana male ; eleven berries ripened, containing nineteen seeds, which yielded five plants.
 70. Delaware *female* with Rogers 4 male ; failed.
 71. Rogers 4 *female* with Clinton male ; four berries ripened, containing five seeds, which yielded one plant.
 72. Rogers 4 *female* with Hartford Prolific male ; two berries ripened, containing four seeds, which yielded three plants.
 73. Rogers 4 *female* with Delaware male ; failed.
- Tried to cross Hartford Prolific with Duchess Buccleuch, Wilmot's Hamburg and Muscat Hamburg, but all failed.
- Tried also Concord with Buckland's Sweetwater, Muscat Hamburg, Royal Muscadine, Chasselas Musque, Syrian, Ingram's Hardy Muscat, Wilmot's Hamburg, Rose Chasselas, Rogers 15, and Rogers 4, but these also failed.
74. Concord *female* with Lady Downes male ; four berries matured, containing four seeds, which were not well ripened and none of them germinated.

1872.

During this year I have entirely failed in all attempts at crossing the grape, except in one instance—that of a grape I got for Salem, but which is probably Rogers No. 43.

75. Rogers No. 43 *female* with Delaware male ; five berries ripened, containing ten seeds, which have been sown in a seed bed.

I submit the list of failures. Hartford Prolific with Muscat Hamburg, Buckland's Sweetwater, Duchess Buccleugh, Royal Muscadine, Rogers No. 43, Delaware and Rogers 4. It is worthy of remark here that I have never yet succeeded in crossing Hartford Prolific as *female* with any other variety. Also Rogers 43 with Duchess Buccleuch and Black Hamburg ; Delaware with Concord, Rogers 43, Rogers 4 and Hartford Prolific ; Concord with Delaware, Duchess Buccleuch, Rogers 43, Hartford Prolific, Muscat Hamburg and Black Hamburg.

RASPBERRY AND BLACKBERRY.

1869.

1. The only cross made this year was between Philadelphia *female* with Brinckle's Orange *male*; operated on three bunches of flowers; imperfect berries were formed on each bunch. The seeds from these were sown in August, and the young seedling plants appeared late in May 1870, and were transplanted early in June, numbering 76 in all. Of these, 12 died during the summer, leaving 54, which were transplanted into open ground the following spring (1871), planted four feet apart, where 52 of them made fair growth—the other two died. Forty-four have blossomed during the past season, twenty-six of which are probably worthless, the flowers being imperfect; twelve others set only fairly; eight had their canes winter-killed, or otherwise destroyed, and did not flower; the remaining six will probably be worth cultivating, some of which may prove of superior excellence. Although the foliage and habits of the plants varied much, some of them resembling the Philadelphia, others the Brinckle's Orange, yet the fruit of all, thus far, has been red. That which I think to be the most promising plant of them all has the berry large, conical, bright red, good flavour, moderately firm, and a most abundant bearer, later than the Philadelphia.

1870.

2. Doolittle Black Cap *female* with Brinckle's Orange raspberry *male*; in this instance, some portions of the fruit set; but the branch was injured before it ripened, and withered prematurely.

3. Doolittle Black Cap *female* with Lawton blackberry *male*; several imperfect berries ripened, the seeds of which were planted as usual, just after ripening, but they failed to germinate.

4. Doolittle Black Cap *female* with Philadelphia *male*; operated on five flowers, all of which produced imperfect berries. Seeds from these yielded thirty-five plants the following spring (1871). Twenty-nine of them survived the first season, and this summer two of the strongest of the plants bore a few berries, which resembled the black cap in form, but were dark red instead of black, and the flavour seemed to be a curious mixture between the black and red raspberries. The plants were very small for fruit-bearing, and possibly the fruit did not attain its full perfection. These are all now strong plants, which will fruit well next season. I was curious to see whether these hybrids would follow the habits of the female in its mode of propagation, that of rooting from the tip, or would send up suckers like the male. I find, however, that, as far as I have seen, they all resemble the female in this respect, although they do not strike root so readily as the black cap does.

5. Philadelphia *female* with Lawton blackberry *male*; two imperfect berries were formed and matured, the seed of which was sown about the last of July, but did not germinate.

6. Philadelphia *female* with Mammoth Cluster black cap *male*; failed.

7. Philadelphia *female* with Kittatinny blackberry *male*; in this instance three imperfect berries matured, and seed was duly sown, but without result.

8. Brinckle's Orange *female* with Lawton blackberry *male*; one imperfect berry ripened, containing only two seeds, which also failed to germinate.

9. Brinckle's Orange *female* with Kittatinny blackberry *male*; failed.

10. Brinckle's Orange *female* with Mammoth cluster *male*; failed.

11. Brinckle's Orange *female* with Philadelphia *male*; failed.

12. Brinckle's Orange *female* with Doolittle Black Cap *male*; failed.

13. Lawton blackberry *female* with Philadelphia raspberry *male*; failed.

14. Lawton *female* with red Antwerp raspberry *male*; failed.

15. Lawton *female* with Doolittle Black Cap *male*; failed.

16. Lawton *female* with Brinckle's Orange raspberry *male*; failed.

1871.

17. Doolittle black cap *female* with Brinckle's Orange *male*; operated on six flowers; two or three imperfect berries were formed, but did not ripen well; seed failed to grow.

18. Doolittle Black Cap *female* with Lawton blackberry *male*; operated on four flowers, from which four imperfect berries were obtained; seed sown 20th July; one plant appeared this spring (1872), which died during the great drought of summer, after getting into the third leaf.

19. Doolittle Black Cap *female* with Franconia raspberry *male*; operated on three flowers; failed.

20. Doolittle Black Cap *female* with Kittatinny blackberry *male*; operated on six flowers; failed.

21. Doolittle Black Cap *female* with Sable Queen blackberry *male*; operated on five flowers; the branch on which these flowers grew was accidentally broken off a short time after the attempt to fertilize had taken place.

22. Brinckle's Orange *female* with Doolittle Black Cap *male*; operated on seven flowers, resulting in one well-ripened berry, the seed from which failed to germinate.

23. Brinckle's orange *female* with Mammoth cluster *male*; operated on five flowers; failed.

24. Brinckle's Orange *female* with Lawton blackberry *male*; operated on six flowers. from which were obtained four ripe berries, two nearly perfect, the other two with a few seeds only in each; one seed only germinated, but the young plant did not survive the drought which prevailed early in the summer.

25. Brinckle's Orange *female* with Kittatinny blackberry *male*; operated on five flowers; product, one nearly perfect berry, which ripened well; the seed from this produced three plants, all of which died while young, in the same manner as the last referred to.

26. Brinckle's Orange *female* with Sable Queen blackberry *male*; operated on four flowers; product, one well-ripened berry, nearly perfect, the seed of which has not germinated.

27. Philadelphia *female* with Mammoth Cluster *male*; operated on seven flowers; failed.

28. Philadelphia *female* with Lawton blackberry *male*; operated on six flowers from which four imperfect berries were gathered, containing seventeen seeds, none of which germinated.

29. Philadelphia *female* with Kittatinny blackberry *male*; operated on eight flowers; five very imperfect berries ripened, yielding twelve seeds in all, but only one germinated; the plant in this instance also died young.

30. Philadelphia *female* with Sable Queen blackberry *male*; operated on eight flowers, six of which set a few seeds, some not more than two or three each; two plants were produced, and they also died young.

31. Philadelphia *female* with Clarke raspberry *male*; operated on seven flowers; the branch on which these were situated accidentally broke, and withered before the seeds were fully ripe; one of the berries, however, had nearly ripened, and the seed from this produced six plants, five of which have died during the summer, one only remaining alive now.

32. Philadelphia *female* with Franconia raspberry *male*; this bunch was on the same branch as the last; the berries set, but withered before they were ripe; hence the seeds did not germinate.

33. Lawton blackberry *female* with Mammoth Cluster black cap *male*; one imperfect berry resulted, which produced two seeds only; these did not germinate.

34. Lawton blackberry *female* with Kittatinny blackberry *male*; three berries ripened well, producing sixty-eight seeds, not one of which has germinated.

35. Lawton blackberry *female* with Philadelphia raspberry *male*; one berry ripened, yielding many seeds, none of which have germinated.

36. Lawton blackberry *female* with Brinckle's Orange raspberry *male*; operated on four flowers; failed.

37. Lawton blackberry *female* with Sable Queen blackberry *male*; one berry ripened, yielding eleven seeds, none of which have germinated.

1872.

This year I have experimented but little with the raspberry or blackberry, and in every instance failed. I have tried to cross one of my hybrids between Philadelphia and

Brinckle's Orange, with Brinckle's Orange again, and also with Doolittle Black Cap, have also tried Brinckle's Orange with Wilson's early and Kittatinny blackberries, and the Lawton blackberry with Brinckle's Orange and Philadelphia raspberries; but not a berry has ripened in any instance.

THE PEAR.

1869.

Tried to cross Seckel with Duchess d'Angouleme, and Duchess d'Angouleme with Seckel, also Beurre Clairgeau, Flemish Beauty, Louise Bonne de Jersey, Beurre Diel, and Vicar of Winkfield, all with Seckel, but in every instance failed.

1870.

1. Seckel *female* with Duchess d'Angouleme *male*; in this instance one pear matured, yielding three seeds, not very well ripened, none of which grew.

Tried also to cross eight other varieties; they were operated on May 14th, and re-ouched with pollen May 17th, but all failed.

1871.

2. Bartlett *female* with Seckel *male*; failed.

3. Bartlett *female* with Easter Beurre *male*; two pears set and perfected, yielding fourteen well ripened seeds, but none of them have germinated.

4. Bartlett *female* with Lawrence *male*; failed.

5. Duchess d'Angouleme *female* with Bartlett *male*; failed.

6. Duchess d'Angouleme *female* with Seckel *male*; failed.

7. Seckel *female* with Duchess d'Angouleme *male*; operated on four flowers, three pears ripened yielding seventeen seeds, three of which have germinated, and the young trees are still living.

8. Seckel *female* with Bartlett *male*: operated on four blossoms, one pear set and ripened yielding only one perfect seed which has not germinated.

9. Seckel *female* with Doyenne d'Ete *male*; operated on three flowers, one pear perfected, yielding five seeds, none of which have germinated.

10. Seckel *female* with Flemish Beauty *male*; operated on two blossoms; failed.

11. Seckel *female* with Easter Beurre *male*; failed.

12. Glout Moreceau *female* with Seckel *male*; operated on four flowers, one pear perfected, yielding seven seeds, three of which have germinated, and the young trees are living.

13. Glout Moreceau *female* with White Doyenne *male*; operated on three flowers; failed.

14. Doyenne d'Ete *female* with Duchess d'Angouleme *male*; operated on three flowers; failed.

15. Doyenne d'Ete *female* with Bartlett *male*; operated on four flowers; failed.

16. Doyenne d'Ete *female* with Flemish Beauty *male*; failed.

17. Doyenne d'Ete *female* with Seckel *male*; operated on six blossoms; failed.

18. Louise Bonne de Jersey *female* with Bartlett *male*; operated on two blossoms, failed.

19. Louise Bonne de Jersey *female* with Seckel *male*; operated on three flowers; failed.

20. Louise Bonne de Jersey *female* with Duchess d'Angouleme *male*; operated on six flowers; failed.

Several attempts were made to cross the pear with the apple, and *vice versa*, both in 1870 and 1871, and although in every instance the pollen was abundant, and was liberally applied, no result was gained.

Experiments were also made with the Cherry. Early Richmond was worked with Elton, and Governor Wood, and Late Duke with Rockport Bigarreau, all without result. Rockport Bigarreau was crossed with Late Duke; eleven flowers were operated and no one cherry perfected, but the seed failed to grow.

Having now completed these details, which to those who have paid little attention to this subject, will, I fear, be regarded as very uninteresting, a summary will be given of work done and results gained, followed by a list of the various hybrids which still survive. It is unnecessary to enter into particulars regarding the mishaps which have from time to time lessened the number of these seedlings, the severe cold of winter, the summer's drought and untoward accidents, have all helped in thinning out the more delicate plants. Possibly some of the seeds sown in the fall of 1871, which have thus far failed to grow, may germinate in the spring of 1873.

THE GOOSEBERRY.

1868	About 48	flowers operated on,	yielding 15 berries,	producing 41 plants.
1870	" 12	" " " "	1 " "	5 "
1871	" 160	" " " "	11 " "	105 "

Of the seedlings of 1868, 23 are living, 10 of which fruited during the past season and several of them promise to be worthy of cultivation. The variations in habit and growth of bushes, as well as in the form and colour of fruit, are very striking, some of them taking after one parent, others after the other. Of those of 1870, only one now remains; while of the seedlings of 1871, sixty-six now survive.

In working with the *Grape* from 25 to 30 flowers or more were operated on in each case; supposing the average to be 25, at this ratio in

1868.	300	Flowers were operated on	yielding 116 berries	producing 106 plants.
1869.	675	" " " "	76 " "	85 "
1870.	625	" " " "	77 " "	61 "
1871.	1125	" " " "	196 " "	149 "
1872.	475	" " " "	5 " "	producing ten seeds just planted.

Of the 106 seedlings from seed of 1868, only one now survives, and that is weakly. Of the 85 of 1869, 27 are still living. Of the 61 of 1870, 43 are now living, while of the 149 the result of the labours of 1871, 110 still survive.

THE RASPBERRY AND BLACKBERRY.

In experimenting on the *Raspberry* and *Blackberry*, an average of five or six flowers were worked, taking the smaller number in

1869.	15	Flowers were operated on,	yielding berries,	producing 76 plants.
1870.	75	" " " "	14 " "	35 "
1871.	110	" " " "	35 " "	14 "
1872.	35	" " " "	none.	

THE PEAR.

Not many crosses have been made by me with *Pears*, I have been very unsuccessful in this department.

1869. About 50 flowers were operated on without result.

1870. " 45 " " yielding one pear which ripened 3 seeds which did not germinate.

1871. About 95 flowers were worked, 8 pears ripened yielding 44 seeds, which have thus far only produced six plants.

LIST OF CROSSES NOW LIVING, WITH THEIR NUMBERS AND PARENTAGE.

The Gooseberry, from seed of

1868. 8 Plants Houghton's Seedling *female* with Warrington *male*.

" 14 " " " " Roaring Lion " "

" 1 " " " " " Ashton's Seedling " "

from seed of 1870, 1 Plant Houghton's Seedling, *female*, with Whitesmith *male*.

" " 1871, 16 " " " " " Ashton's Seedling *male*.

from seed of 1871,	12	Plant Houghton's Seedling, <i>female</i> , with Whitesmith.
" " "	21	" " " " " Broom Girl.
" " "	9	Downing's Seedling <i>female</i> with Roaring Lion <i>male</i> .
" " "	8	Wild thornless Gooseberry (<i>Ribes hirtellum</i>) <i>female</i> with Roaring Lion <i>male</i> .

90 The seeds resulting from the work of 1872 are still in the ground, see Nos. 24, 26, and 28.

THE GRAPE.

From seed of 1868,	1	Plant Clinton <i>female</i> with Syrian <i>male</i> .
" " 1869,	1	" Seedling <i>female</i> with Muscat Hamburg <i>male</i> .
" " "	4	" " " " Duchess Buccleuch "
" " "	1	" " " " Buckland's Sweetwater <i>male</i> .
" " "	3	" " " " Muscat Otonell "
" " "	10	" " " " Black Frontignan "
" " "	2	" " " " Grizzly Frontignan "
" " "	6	" " " " Victoria Hamburg "
" " 1870,	10	" Clinton <i>female</i> with Muscat Hamburg "
" " "	2	" " " " Syrian "
" " "	4	" Concord " " Duchess Buccleuch "
" " "	11	" Delaware " " Muscat Hamburg "
" " "	2	" " " " Victoria Hamburg "
" " "	1	" " " " Chasselas Musque "
" " "	10	" Seedling " " Muscat D'Aout "
" " "	3	" " " " Chasselas Musque "
" " 1871,	1	" Clinton <i>female</i> , with Rogers No. 4 <i>male</i>
" " "	5	" " " " Muscat Hamburg "
" " "	3	" " " " Golden Chasselas "
" " "	1	" " " " Buckland's Sweetwater "
" " "	3	" " " " Syrian "
" " "	16	" " " " Muscat Otonell "
" " "	18	" Delaware " " Duchess Buccleuch "
" " "	2	" " " " Syrian "
" " "	2	" " " " Chasselas Musque "
" " "	12	" " " " Diana "
" " "	1	" Roger's No. 4 " Clinton "
" " "	3	" Roger's No. 4 " Hartford Prolific "
" " "	26	" Seedling <i>female</i> " Ingram's Hardy Muscat "
" " "	5	" " " " Royal Muscadine "
" " "	12	" " " " Black Hamburg "

181 The seeds resulting from the work of 1872 are still in the ground, see No. 74.

THE RASPBERRY.

From seed of 1869,	52	Plants, Philadelphia <i>female</i> with Brinckle's Orange <i>male</i> .
" " 1870,	29	" Doolittle Black-cap, <i>female</i> , with Philadelphia "
" " 1871,	1	" Philadelphia " " Clarke "

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THE PEAR.

From seed of 1871,	3	Plants, Seckel <i>female</i> with Duchess d'Angouleme <i>male</i> .
" " "	3	" Glout Morceau <i>female</i> with Seckel <i>male</i> .

REPORT OF THE COMMITTEE

Appointed to examine personally the County of Huron, and report upon the character of the soil, and the capabilities of the County for the production of Fruit, its peculiar advantages and disadvantages, and present Fruit productions.

To the President and Directors of the Fruit Growers' Association of Ontario.

GENTLEMEN—The undersigned, appointed by your Association to report upon the capabilities of the County of Huron for fruit growing, and what has been done in this direction in that section of the country, report as follows :—

Owing to business engagements, we found it impossible to devote so much time to a personal examination of all parts of the County, owing to its large extent, as we would have wished, and we arranged to commence our labours by putting in an appearance at the exhibition of the Goderich Horticultural Society, held at Goderich, September 18. Here we found a splendid collection of fruit of all kinds, proving most incontestibly the admirable adaptability of the County for fruit growing.

Apples.—Apples were splendid, and in great variety. The principal exhibitors of this fruit were Messrs. George Cox and James Torrance, of Goderich Township, and John Stewart, of Colborne. The principal varieties shown, and in greatest perfection, were Rhode Island Greening, Baldwin, Duchess of Oldenburg, Hawley Northern Spy, Swaar, Snow, Twenty-ounce Pippin, Roxbury Russet, and Hubbardston's Non-such. The remarkable size of the fruit, and its clean and perfect growth, free from spot or blemish, was remarkable.

Pears.—In pears, the principal exhibitors were Messrs. A. M. Ross and A. Watson, of Goderich, and Stewart, of Colborne. The samples shown were very fine, embracing Flemish Beauty, Bartlett, Louise Bonne de Jersey, Belle Lucrative, Onondaga, Stevens Genessee, Beurre d'Anjou, and Vicar of Winkfield. The quality and size of the fruit spoke well for the success obtained in the cultivation of this fruit.

Plums.—This section of the country has become famed for its plums, and, as might therefore be expected, the show of this fine fruit was splendid. The principal exhibitors were Messrs. Ross, Watson, Stewart, and Moseley. Extra fine specimens were shown of Washington, Jefferson, Pond's Seedling, Victoria, Duane's Purple, Smith's Orleans, Bradshaw, and Lombard. The curculio has only made its appearance in this section within the last two years, but the rot has been found more destructive than the little Turk. Growers say the latter can be kept under by attention; whereas the remedy for the former has not yet been discovered.

Peaches.—The fine show of this rather tender fruit proves satisfactorily that the portion of the County lying along the eastern shore of Lake Huron can take rank as one of the most favoured for fruit growing. The varieties shown were Early and Late Crawford, Bergens Yellow, George IV, Large Early York, and Gross Mignonne. The principal exhibitors were Messrs. Moseley, Henry Horton, Cox, and Ross.

Grapes.—Of open air Grapes, a very fine show was made. Mr. Ross, the principal exhibitor, showed twenty-four varieties, and the remark made as to favourable climate, under peaches, received from the show of this fruit further corroboration. Some very fine bunches of Eumelan were shown by Mr. Ross from the vine sent out by the Association in 1870, and he is warm in his praises of the promise of this variety. Creveling, also, was good, and the bunches showed a greater compactness than is usual with this variety. Looseness of bunch is the only fault of this grape, and if grown alongside of Concord, Isabella, or other free setting variety, this defect is much lessened. In Grapes under glass, the principal exhibitors were M. C. Cameron, Esq., M.P., and Dr. McDougall. Altogether, the exhibition was an evidence that fruit growing has taken a firm and healthy hold of the people of this section, and that in it they have got an element of amusement and profit that seems to thrive in their hands.

A tour was made through the orchards of some of the principal fruit growers in Goderich Town and Township, and in Stanley. The thrifty and healthy character of the trees was everywhere remarkable, and the size of the Plum trees, in many places, was

noticeable, black knot not having been fatal to this tree here, as in many other localities. Amongst the orchards we visited, we may mention those of Messrs. John Hunter, H. Hinks, James Torrance, John Moseley, and W. Hall, of Goderich Township, Ritchie, of Stanley, and James Stewart, of Colborne—all successful fruit growers, and, as their success shows, take an intelligent interest in the care and management of their trees. Without giving an individual opinion of each of the parties visited, we found that the general testimony was in favour of the following lists of Apples and Pears. In Apples—Baldwin, Spy, Twenty-ounce Pippin, Primate, Red Astrachan, Rhode Island Greening, Roxbury Russet, Ribston Pippin, Pomme Grise, Hubbardston's Non-such, King of Tompkins, Snow, Duchess of Oldenburg, and Swaar. In Pears—Flemish Beauty, Louise Bonne, Bartlett, Howell, Belle Lucrative, Onondaga, Winter Nelis, Buerre Diel, and Beurre d'Anjou.

We also visited some of the most successful growers in the neighbourhood of Seaforth, and inspected the fruit shown at the Tuckersmith fall show, held in Seaforth. Amongst those in this section whom we interviewed we mention Messrs. James Dickson, R. Londesboro, John Londesboro, and E. Cresswell, of Tuckersmith; John M'Millan, of Hullett; George Hamilton, of Cromarty; and T. Torrance and James Scott, of McKillop. Here the same lists of Apples and Pears as already given for vicinity of Goderich seem to have preference, with the exception of the Baldwin, which is found tender here, the trees being liable to be winter killed. The fruit crop here had not been up to the average this season, owing to the extreme drought, which had affected the size of the fruit very materially, and had caused a great deal of it to drop prematurely. Pear blight had been very bad this season. One thing we noticed at the show at Seaforth, and to some extent also at Goderich—viz. the erroneous names under which much of the fruit is shown. This is mainly due to the practice of purchasing trees from travelling agents, from whom, as a rule, there is no guarantee of getting the trees true to name. Let intending planters deal directly with responsible nurserymen, even if it costs them a few dollars more for freight or express charges, and there will not be so much of this almost universal complaint that the trees, when they come to fruit, are not of the varieties ordered. Let nurserymen also take a warning, for assuredly those who are found to be most reliable in this respect, and whose trees turn out true to name, will receive the public patronage.

The character of the soil of the County is generally of a rich clay loam; but along the lake shore it is lighter, and this lighter soil, together with the tempering influence of the lake, makes the growth of Peaches, Nectarines, Apricots, and Grapes, along a belt of from six to eight miles next the lake, more successful than further inland.

From all we have seen, and from the testimony of cultivators, we would class the County of Huron as equal to any section of Canada for Apples, Pears, and Plums; for Grapes, Peaches, and the more tender varieties of fruit—the belt along the shore of Lake Huron is almost if not fully equal to the Niagara District. In all sections of the County, fruit growing is and can be made profitable. Young orchards are being planted largely, and in a few years this County will be one of the best fruit producing sections of Canada. On the disputed point as to the proper treatment of bearing orchards, the evidence of cultivators here is mostly in favour of seeding down the orchard in grass, and mulching liberally with barn-yard manure; but this must not be done with young trees. Many young orchards of fair promise have been stunted and cramped in their growth, if not altogether destroyed, by allowing the young trees to be choked with grass. For the first five or six years, the orchard should be lightly cultivated in root crops, and after the trees are well established, and come fairly into bearing, it may be seeded down in grass.

Many remarked to us, when travelling round, that, when they planted again, they would have nothing but low-headed trees, the high winds in September shaken so much of the fruit off, which was quite lost; and the difficulty of carefully hand picking fruit off high trees was very great in comparison to low-branched ones.

We have no doubt that, in a few years, many large orchards will be planted all through that section, as both climate and soil are well adapted to the growth of the Apple.

D. CALDWELL, } Committee.
A. M. ROSS, }

MISCELLANEOUS ITEMS.

CATS AS FRUIT AND SEED PROTECTORS.

A correspondent of *Land and Water* writes—"It often appears to me that people for the most part are not aware of the great use cats are to us. Of course, we know of their use with respect to mice and rats, but do we generally know of the invaluable help they can give us in protecting from birds our garden fruits and flowers ?

To keep off the birds how simple, how certain, how small is the cost of a cat on a small chain sliding on a wire, and giving the animal the walk up and down the whole length of the strawberry beds. A knot at each end of the wire readily prevents the cat from twisting round the post which supports the wire, and a small kennel placed in the middle of the walk affords her shelter and a home for her kittens. In large gardens a second cat is required, and the young ones in their frequent visits to each other greatly assist in scaring away the birds. I have for more than thirty years used, and seen used with perfect success, this easy method of protecting fruit, and the very same plan is equally good in keeping hares and rabbits off flower beds. After the first few days cats in no way dislike this partial restraint, and when set quite free, after a few weeks watching, they will of their own accord continue on guard. The kittens more especially attach themselves to this garden occupation, and of their own accord become the gardener's best allies."

FRUIT AT GLENCOE.

No grape ripening later than the Delaware has ripened with me this last season. The bunches of a few Clintons and of all the Ionas were thinned by rot. The severe frost of the 19th and 20th September left much unripened wood. Of fifty-one varieties in cultivation, the Autuchon alone had the foliage mildewed, and that so badly that there is not a ripe bud on the vine.

The spotted *Pelidnota* and the *Wood Nymph* put in an appearance, but not in sufficient numbers to injure the vines,

The Israella grape vine sun-scalds, and is a very slow grower. The Adirondac winter kills.

W. SUTHERLAND.

Roundhouse Vineyard, Jan., 1872.

ON FERTILIZERS.—I suppose I am expected to say something about fertilizers ; all agriculturists do. When you plant, you think you cannot fertilize too much ; when you get the bills for the manure, you think you cannot fertilize too little. It is the great question of modern times—how to fertilize without ruinous expense ; how, in short, not to starve the earth to death while we get our living out of it. Practically, the business is hardly to the taste of a person of a poetic turn of mind. The details of fertilizing are not agreeable. It is much pleasanter and easier to fertilize with a pen, as the agricultural writers do, than with a fork.—*My Summer in a Garden*.

FRUIT AT BERLIN.

To the Directors of the Fruit Growers' Association of Ontario.

The introduction of the Tetofsky apple into this part of the country would be a great benefit to the community, as it would just meet the want felt, viz : an apple to fill the place of the Early Harvest, which is here rather a poor bearer and the fruit so scabby as to be almost useless.

I introduced the Duchess of Oldenburg to this neighbourhood about ten years ago, and now it is generally disseminated. Those who have bearing trees of this variety, and it is a heavy bearer, usually get twice as much per bushel as for other apples, for although the fruit is not first rate in quality, it has a splendid appearance, a quality that is of some importance now-a-days. The ladies say it is splendid for cooking.

The Wagner apple was introduced here about fifteen years ago from Western New

York, and was subsequently propagated and widely disseminated by Mr. James Dickie, a nursery-man, near Galt. It appears to be a good cropper, and the fruit is of very good quality; but I am inclined to think the tree is not a very vigorous grower, its habit being much like that of the Keswick Codlin or Hawthornden. It is not as hardy a tree as the Northern Spy.

I fruited the Beurre Clairgeau for two or three years, but I must say that I did not find it to be in point of flavour any improvement upon a Swedish turnip. Towards maturity its fine appearance bespeaks better things for it. The fruit, however, sells well for canning purposes, and the tree, with me, is as hardy as a sugar maple.

The McLaughlin plum is certainly a titbit in point of flavour, but here it is not very productive, and not very hardy. It may do very well in the collection of an amateur, but the Washington and Imperial Gage are the plums to make money out of.

I find that all the purple and golden plums, such as Bingham and Coe's Golden Drop, are more tender than the green varieties, and should be planted in well drained ground and well protected from cold winds. In my collection of plums I find the Bradshaw and Pond's seedling the only two varieties yet introduced that are able to take care of themselves.

I have not tried to grow peaches, not because the trees will not grow but because they grow too well, I am, however, sanguine that in the course of a few years, when the rank fertility of the soil is sufficiently exhausted, peaches will live here as well as in some other parts of the Province.

When I settled here, some twenty-five years ago, the Heart and Bigarreau cherries would not grow, now large quantities are planted annually with success.

In the vine line I am about full, and have no room for the introduction of any more, for experimental purposes, until something turns up that will supersede the Delaware. As long as I can sell Delawares to the exclusion of the black varieties from the market I am satisfied.

SIMON ROY.

A GARDENER'S PLEASURES.—There is no prettier sight, to my eye, than a gardener on a ladder in his grape arbour, selecting the heaviest clusters of grapes, and handing them down to one and another of a group of neighbours and friends, who stand under the shade of the trees, flecked with the sunlight, and cry "How sweet!" "What nice ones!" and the like—remarks encouraging to the man on the ladder. It is a great pleasure to see people eat grapes.—*Warner*.

PEAR-TREE BLIGHT.

On page of 35 of the proceedings of the thirteenth session of the American Pomological Society is a very interesting letter from J. F. Tallant, of Burlington, Iowa, in which among other things he says:—"I have lost fifty times as many (pear) trees by blight as I have now growing. In 1864, I was induced to cease cultivating them altogether, to allow the grass to grow close up to the trees, only keeping it cut every few weeks, and to obviate the binding and repressive effects of this treatment by putting a wheelbarrow load of manure around each tree every autumn. Since that date, eight years ago, I have never lost a tree, and even saved some old wrecks which I had given up as past cure, which are now the most interesting specimens on the place. The success of the present year has been that of the preceding seven. I do not give this treatment at all as a cure for blight, for it may return again; but I do wish to make it public, that o'hers may try the same method with, it is hoped, the same success."

NEW PEAR—ELLIOT'S EARLY.

To the Directors of the Fruit Growers' Association of Ontario.

Your Committee on Seedling Fruits, beg to report upon the Elliot seedling pear, submitted and sent from two sections of Ontario, one package of specimens coming from Mr. James Dougall, of Windsor; the other from Mr. Simon Roy, of Berlin.

We proceed to describe those sent by Mr. Dougall of Windsor, and received 27th July 1872, fully ripe at this date ; fruit rather small in size, short pyriform with a very small fleshy lip ; skin smooth, pale yellowish green, with a pale brown cheek ; one side of these pears is flattish, having somewhat the appearance of a suture, stalk stout, from 2 to 2½ inches long, inserted without depression, a little, oblique calyx open and set in a moderately wide corrugated basin. Flesh juicy and agreeably refreshing ; from appearance of spur and stems, fruit hangs in clusters.

As to the other package containing specimens submitted by Mr. Simon Roy, of Berlin, and also called the Elliott Seedling, your committee mark such a difference in many essential respects from those received from Windsor, will proceed to point out these marks of distinction, namely, size of fruit nearly medium. As compared with those coming from Windsor, long pyriform, with a distinctly brown streaked cheek, calyx closed, and stems, which unfortunately were curtailed in their full length, set at nearly right angles to the fruit.

Fruit having unusually fleshy protuberance or lip extending along the upper side of this extremely oblique stem, half an inch, all the specimens at this date August the 2nd still firm and unripe. Your committee feel considerable doubt as to their being the product of the same seedling, and would recommend the appointment of a suitable committee to visit the trees in bearing, another season, should the gentlemen putting them forward request it.

All of which we beg to submit.

W. HOLTON.
JOHN FREED.
W. H. MILLS.
R. BURNET.

PLUM TREES.

Records of failure may be useful, but records of success are much more inviting to your rural friends. Perhaps, sir, you are the owner of a plum tree and have known the feeling of disappointment, when morning after morning you have found half-grown plums carpeting the ground. Perhaps you have, on examination, found the stem almost eaten through, or so black and decayed that it could no longer bear the weight ; and almost always a minute worm in the plum itself. Such was the fate of my plum crop for a number of years, but now it is as certain to ripen into full maturity as is the crop of the adjoining apple orchard. My remedy is a simple one. When the tree is in full blow, and whilst the dew is still on, I scatter several handfuls of unleached hardwood ashes on the blossoms, repeating it a day or two after. For the last four years this has insured me a most abundant crop. I suppose that it destroys the egg of the insect which does the mischief, but, whatever the theory, the fact will prove of service to your readers. A word of caution is necessary here. Ashes have not proved serviceable in my experience to either apple or peach trees, when applied to the blossoms, though, of course, valuable as fertilizers. This "top dressing" is worthy of much study, and many experiments.—Plaster on "apple blossoms" is very beneficial to that crop, but I am informed that it is death to the "peach."

SHADE TREES.

You had some time since a most serviceable article in the *Globe* on this subject, but the writer apparently had not the experience to enable him to do more than make general suggestions. I have planted many trees for ornament and shade, and have been successful in making them live, but you have so often pointed out the best methods both of "taking up" and setting out, that I might fairly say my success has been from following nature's laws as pointed out by you. My object now, is simply to speak of the best varieties for shade and ornament. I do not like uniformity. Occasionally an avenue of elms may be very imposing, but to most eyes there is a special charm in variety, especially if there is a tolerable uniformity in the rapidity of growth. To secure this I mulch plentifully with long manure in the spring, and in the fall dig it in, leaving the soil open and loose for the action of the frost. Of all ornamental trees I give the preference to the "basswood." Its broad leaf soon makes a young tree a welcome shade from the hot sun, and its habit of growth makes quite as ornamental a top as "sugar maple." The

“whitewood” with its beautiful “tulip” flower, is also hardy, and grows into a handsome shape. All know the value of the “sugar maple,” yet where the soil is heavy, it seems to linger out an unhappy and unhealthy existence. For such soil the “swamp maple” is much better adapted, and has the additional merit of more beautiful tints when touched with the first autumn frosts. I use, and suggest for the use of others, a mingling of the above varieties with the elm, as sure to make beautiful city, town, or rural village. They should be at least 25 feet apart. Were our country roads thus planted, at but trifling expense, it would, I am sure, develop a love of the beautiful, besides proving very attractive to the travel-worn emigrant, seeking a new home.

CHARLES DAWBARN.

ORNAMENTAL SHADE TREES.

In driving through some of our townships one cannot fail to notice that the appearance of the country is rendered very desolate by the absence of isolated and ornamental trees. Not to enter here into the question of the ill effects upon the surface of the land of an utter denuding of all trees, we would simply point to the barren appearance that is the result of such wholesale mutilation.

It is urged that it is useless to leave forest trees standing by themselves when the bush is cut down. Doubtless, it is true that most varieties of forest trees will die or be up-rooted by high winds, when deprived of the shelter of companions. Where such is the case, though the appearance of certain townships proves that it is not always a necessary sequence, we would have every inducement held out to our farmers to plant out saplings. If owners of dwellings or of farms have not sufficient taste to beautify their own property, let the public at least endeavour to induce such men, by the hopes of pecuniary compensation, to plant trees along the public roads. Let the counties or townships vote a bonus to the planter for every tree which shall be set along the highway, and which shall be living, say, three years after planting. If a tree survive its removal for three years, the chances are that it will grow to a large and handsome one.

If we live ten years from to-day, such trees as are now set out will do much to relieve the desolate appearance of too many of our landscapes; and to those who are living twenty years hence, and to our children, the appearance of the country will rival the arboreal beauty of old England. We may then, with our old country friends, eulogise “the shady lanes and leafy bowers.”

EFFECTS OF FORESTS ON CLIMATE.

The following observations (which we find in the *London Garden*), while they may not establish the effects of forests on climate are certainly valuable in that direction. They were made by M. Mathieu, Professor in the School of Forestry at Nancy and were reported by him to the *Congres Agricole Libre*, at Nancy, in 1869. They include the first eight months of each of the years named, and were made in reference to the following points:—

1st. Does the wooded condition of a country exercise an influence upon the amount of rain it receives?

The answer to this question was attempted by taking two stations at an equal height above the sea, but separated between fifteen and twenty miles, the one situated in a wooded, and the other in a cultivated country, and observing the rainfall. The result reduced to inches was that at the Agricultural station the rainfall for the three seasons was 82·02 inches, and at the Forest station 93·13 inches; difference in favour of the Forest station of 11·11 inches.

The second question was:—Does the covert of the forest, by intercepting the rain falling from the atmosphere, diminish to a considerable extent the amount of rain that reaches the ground? This was answered by placing rain gauges beneath the trees, and in the open ground close at hand, and comparing results which were as follow:—

In open ground.....92·00 inches.

Under the trees.....87·74 “

Difference in favour of open ground. 4·26 “

This shows that while some of the rainfall in a forest does not reach the ground, still by comparing what did reach it with the result at the Agricultural station, we have 87.74 inches for the rainfall under the trees, and 82.02 inches for the fall at the Agricultural station, an excess of 5.72 inches in the Forest.

A third question as to the effect of a wooded country on the conservation of the moisture received by the soil? The answer was sought in a comparison of the evaporation from two equal vessels, one placed in the forest, the other in the open ground. Evaporation went on five times as rapidly, taking the whole year into consideration, in the open air as in the forest, ranging from three to six times, between April and July; 85 per cent. of the rain falling in the open field evaporated, whilst only 22 per cent. of that falling in the forest was lost.

The fourth question was as to the influence of forests upon temperature. The experiments in this direction had been conducted but a short time, but go to show that the mean annual temperature is lower in the woods than in the open country, and that the difference is least in winter and greatest in summer. In 1868 the mean temperature of the forest was lower than that of the open fields by $4^{\circ}35$ in the morning, and $9^{\circ}33$ at night, in July, which difference fell in December to $0^{\circ}48$ in the morning and $0^{\circ}94$ at night. Again, the average variation in temperature was much greater in the open country than under the cover of the forest between day and night. It ranged from $0^{\circ}05$ to $8^{\circ}57$ in the open air, but only from $0^{\circ}04$ to $1^{\circ}22$ in the forest.

GRAPES AT OWEN SOUND.

I had a fine display of grapes last year, especially Rogers' 3, 4, and 15, Concord Creveling, Clinton, Isabella, and a large white one which I cannot name. Iona, Israella, and Delaware do not seem to thrive with me. I am sorry to say the greater part of the grapes were cut down by a very early frost on the night between the 17th and 18th of September. Nearly all within eighteen inches of the ground were saved. No doubt the protection of the leaves and the heat from the warm ground were the cause of this.

Of pears, Beurre Clairgeau (magnificent), Graslin, and Seckel were the best. Beurre Easter was unshapely and gritty. Had a few fine quince. Cherries and peaches do not thrive very well. Plums were superb. Apples all good except the Baldwin; it does not seem to get on in this region. My fine trees have all come to grief. I had a fine display of roses and shrubs last season.

WILLIAM ROY.

EARLY JOE APPLE.

I wish to call the attention of your numerous readers to the excellent qualities of the Early Joe Apple. In my opinion we do not possess another summer dessert apple that can at all compare with it in flavour. We have been enjoying the fruit in my family for the past fortnight, and to-day, September 2nd, as the last are gathered, only regrets are felt that they are nearly gone. It is a great pity that it has not been more widely disseminated, and its most excellent flavour more generally known. When young the tree is a slow grower, and nurserymen have been at no pains to sound its praise as it deserves, because there was no profit in raising the tree at ordinary prices. Yet I am sure that were fruit raisers aware of its excellence they would not hesitate to pay twice the price of ordinary apple trees to obtain it. In Beadle's Canadian Gardener it is stated that the tree seems to be nearly, if not quite, as hardy as the Red Astrachan, and if this be so there can be no difficulty in the way of its being grown in nearly every fruit garden in Ontario.

My tree commenced to bear very young, and has continued to yield good crops of fair, medium sized fruit. The apples have a very handsome appearance, quite red on the side exposed to the sun, and on the shaded side very prettily streaked with red on a light yellow ground. The skin is sprinkled all over with light dots, which usually increase in number towards the eye. The flesh has a rich yellow tint, is very tender, breaking, fine grained, juicy, and of a most agreeable somewhat spicy vinous flavour—quality the very best. Every one who enjoys such a fruit, ought not to be without at least one tree of the Early Joe.

THE GARDEN.

I awake in the morning—and a thriving garden will wake a person up two hours before he ought to be out of bed—and I think of the tomato plants, the leaves like fine lace-work, owing to black bugs that skip around, and can't be caught. Somebody ought to get up before the dew is off (why don't the dew stay on till after a reasonable breakfast ?) and sprinkle soot on the leaves. I wonder if it is I. Soot is so much blacker than the bugs, that they are disgusted, and go away. You can't get up too early if you have a garden. You must be early due yourself if you get ahead of the bugs. I think that, on the whole, it would be best to sit up all night, and sleep day times. Things appear to go on in the night in the garden uncommonly. It would be less trouble to stay up than it is to get up so early.—*My Summer in a Garden.*

FRUIT IN NEW BRUNSWICK.

I have been engaged for several years in growing fruit trees, and being tolerably successful, I intend its further pursuit. I have had scions from different parts of Nova Scotia, some of which have been prosperous in this locality, others less so. Our most prosperous have been the R. I. Greening, Hubbardston Nonsuch, Alexander and Ribston Pippin. English Red Streak and Golden Pippin are good samples for our climate. My Nursery is situate near the Bay of Fundy, on the north side of a slope exposed to the north and north-west winds, and the county (Albert,) fronts on this Bay for some thirty miles. The south-west winds blowing directly up the Bay are unfavourable for fruit growing, yet the most hardy kinds are prosperous.

I have made experiments with wind-breaks for a shelter to my young trees, and find these answer a good purpose.

I see by the *Globe* that the Fruit Growers' Association of Ontario is giving encouragement to its members by supplying them with hardy varieties of scions and young trees, and an annual report containing valuable information.

I should be pleased to become a member of the Association if it be advisable. I enclose a dollar for this purpose.

ISAIAH TINGLEY.

Hopewell Corner,
Albert County,
New Brunswick. }

RESULTS OF CURCULIO CATCHING.

In 1871, Mr. Samuel Burner, of Hamilton, a member of the Fruit Growers' Association of Ontario, by jarring his plum trees, caught *three thousand one hundred and sixty-one* curculio, and drew from the Association therefor the prize of ten dollars. He now writes to the Secretary of the Association as follows:—

"With regard to the number I have caught this season, I might say that I have 'caught but few, as compared with last year, only *eight hundred and six* altogether, or 'only two more than I caught in one morning last year. But the result is equally 'satisfactory, I have a splendid crop of clean plums."

A few days ago we were in the garden of Dr. L. Cross of St. Catharines, and noticed that his plum trees were well filled with fine fruit. The Doctor said that he was well satisfied with the results of but a few hours' work; that for about fifteen days he had spent something like an hour each day in jarring the trees and securing the curculio, and that now he had about a hundred trees well filled with choice plums, and that taking the labour in a pecuniary point of view, he would be most amply repaid for his expenditure in catching the curculio.

There is no reason then why we should let the curculio rob us of our plums. None but the lazy or careless need be without this fine fruit.

CATCHING CURCULIO.

My mode of operation is simply this: I take five yards of ten cent cotton, cut the same in two, then sew the two pieces together for one-half the length; at one

end fasten a long stick, at the other end two short sticks, and then the catcher is complete.

I have eighteen plum trees. Early in the morning and about sundown are the best times in which to catch them in fair weather, for they are certain to take wing if the trees are jarred in the middle of the day.

In 1869 I jarred my trees, and had a fair crop of plums. In 1870 I let the curculio have their way, and I had no plums. In 1871 I declared war against the enemy on the 21st day of May, and continued the contest until the 20th of June, after which time I had no trouble until the fruit began to change colour, when the plums and peaches began to rot. For some time I was baffled in my attempts to ascertain the cause, but by watching closely I at length found the cause without a doubt. I found a plum curculio taking his meal on a peach, and in three days the peach began to rot; next I found my enemy taking his meal on a plum. In two days after the plum began to show signs of rot.

The following is a memorandum of the results of my jarring on the several days mentioned during the season of 1871 :—

		Morning.	Evening.
May	21	0	12
"	22	1	0
"	28	0	16
"	29	1	33
"	30	41	28
"	31	85	50
June	1	18	22
"	2	21	28
"	3	0	25
"	4	23	38
"	5	5	15
"	6	9	2
"	7	10	4
"	8	5	5
"	9	0	1
"	10	2	3
"	11	4	0
"	12	0	3
"	13	1	1
"	14	0	4
"	15	0	0
"	19	0	3
"	24	3	0

I am not an amateur, but a farmer, cultivating one hundred and twenty-six acres in Lot 31 of the 2nd Concession, Township of Humberstone; but as a member of the Fruit Growers' Association of Ontario, I am very happy to be able to say that I do not think any man can lay out his money to better advantage than to become a member of that Association.

If these few simple statements of my method of fighting the curculio and of the results, are of any value to the fruit-growing public, they are welcome to them.

JONAS NEFF.

Port Colborne, January, 1872.

BLACK CAP RASPBERRIES.

The Fruit Growers' Association distributed to each of its members in 1871 a plant of the "Mammoth Cluster," one of the varieties of the above excellent fruit. I believe the cultivation of this species of the raspberry was first undertaken in the United States, and in that country this berry is becoming very popular; the kind under consideration has amongst its good qualities the advantages of being quite hardy, an immense bearer, and is nearly thornless. It is easily propagated by laying down the canes early in the

season and throwing a few inches of soil on them, they will not only root at the tips, but if covered at intervals, all along the stem.

The year I received my black raspberries I was enabled by this means to obtain *Twenty-four* new plants, and this year I could make a hundred if required.

These few facts may be of interest to some of the members of our Association, who are unacquainted with the habits of this variety, and are patiently waiting for it to "sucker," as is the case of the Antwerp family.

Such an one would require more patience than that possessed by the patient man of old, if he wanted to set out a twenty acre "patch" from the product of his humble beginning of the one distributed.

The best plants are made from the "tips," and from now until the second week in September is the proper time to arrange for propagation, and if the bushes are well grown and a number required, the shoots of this year should have been pinched about the middle of July to make them branch, and at this season, or when the tips of the canes show an unusual dark colour, and are bare of leaves, a few inches of soil should be thrown on them, and in a few weeks they will form good plants.

The branch which connects them with the parent stem should be cut after the leaves have fallen, leaving a foot or so on the tip end; this will mark the spot where it grows and it may thus be readily found in the spring, and transplanted into rows. These will not give fruit the first season, but will make a very healthy growth for next year's bearing.

From twenty five to fifty bushes will be found quite sufficient for an ordinary family. I have picked as much as six quarts of fruit from one bush which has been established for two years. The Mammoth Cluster is late in ripening, and the berries will come in a little later than the Antwerp family, and before the blackberry, making a valuable link in the small fruit season.

P. E. BUCKE.

Ottawa, 5th Aug., 1872.

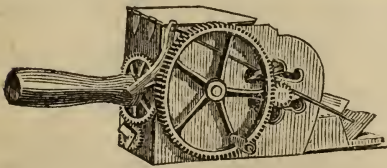
HORTICULTURAL INVENTIONS.

It is always a matter for congratulation when any instrument is produced which lightens the burdens of human toil. Inventive industry has given to the agriculturist the reaper and the threshing machine, but beyond the rake, the hoe, and the wheelbarrow, but little has been done to help the labours of the horticulturist.

Recently the inroads of insect enemies and the blighting devastations of parasitic plants have borne so heavily upon the horticulturist, that it seemed as though he must give up the cultivation of some of his favourite fruits. More especially has the advent of the Gooseberry Sawfly, whose destructive habits have become well-known to every cultivator of the currant and gooseberry, brought consternation and trouble to many an amateur, who took a pride in supplying his table with an abundance of these wholesome fruits.

How, easily, and surely, to get rid of these pests, has been the prevalent inquiry. It was at length discovered that white hellebore applied in the form of a white powder to the leaves of plants, would poison the worms and cause their speedy death. But a simple, economical and rapid mode of applying the powder, so that it should be distributed evenly and thoroughly over the plants, was a desideratum which remained for inventive ingenuity to supply.

Happily for those who suffer from these parasitic and insect pests this long felt want is now provided for, and we are enabled to place before our readers an engraving of an instrument which has been found to be just the thing for distributing powdered hellebore, sulphur, ashes, slacked lime, Paris green, &c., &c., in such a manner that there is not only no waste of these



materials, but they are so applied as to secure the most efficient results.

This instrument is the invention of Mr. P. VanWagener, of Stony Creek, and is manufactured and sold by Messrs. Bauer & Geiss, of Hamilton. By means of this machine the operator is enabled to cover the plants with the desired powder while he is exempt

from the dust. As will be seen by examining the engraving, the instrument is a light portable box, which can be held in the left hand, while with the right hand the operator turns a small wheel. The revolution of this wheel gives a rapid motion to the fans within the box, which creates a strong air blast, that drives the powder, which is made to fall in the centre of the blast, forward from the operator and out of the box upon the plants. By this contrivance the discharge of the powder is continuous, rapid, and regular, and can be thrown in a horizontal direction, or upward, on the under side of the leaves, at the will of the operator. It is much more convenient and efficient than any contrivance in which the air blast is made by the operation of a bellows, and is said to be capable of discharging two hundred and fifty pounds of flour of sulphur in a day. We believe this little instrument, which weighs less than two pounds and a half, which any lad can carry without weariness and work with perfect ease, will prove to be a most efficient machine for the destruction of these insects and many forms of mildew.

THE STRIPED BUG—HOW TO GET RID OF IT.

The best way to deal with the striped bug is to sit down by the hills and patiently watch for him. If you are spry, you can annoy him. This, however, takes time. It takes all day and part of the night. If you get up before the dew is off your plants—it goes off very early—you can sprinkle soot on the plant, and soot is unpleasant to the bug. But the best thing to do is to set a toad to catch the bugs. The toad at once establishes the most intimate relations with the bug. It is a pleasure to see such unity among the lower animals. The difficulty is to make the toad stay and watch the hill. If you know your toad, it is all right. If you do not, you must build a tight fence round the plants, which the toad cannot jump over.—*My Summer in a Garden.*

OUR REPORTS IN ENGLAND.

The Gardener's Magazine for 24th August, 1872, copies a portion of our last year's report on the "Horticultural Department at Washington," and thus gives a wider circulation to matters interesting to us, which but for the Annual Report would not have seen the light in Europe. The Editor heads the extract with the following notice:—

"HORTICULTURE IN AMERICA.

"THE HORTICULTURAL DEPARTMENT AT WASHINGTON.

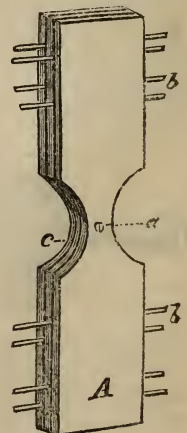
"The following report of a visit to the Horticultural Department at Washington, by Mr. D. W. Beadle, Secretary to the Fruit-Growers' Association of Ontario, Canada, and published in the annual report of that Association, will probably be of considerable interest to a large number of our readers. Mr. Beadle is one of the leading horticulturists of the Province."

THOMAS WIER'S PATENT APPLE-WORM TRAP.

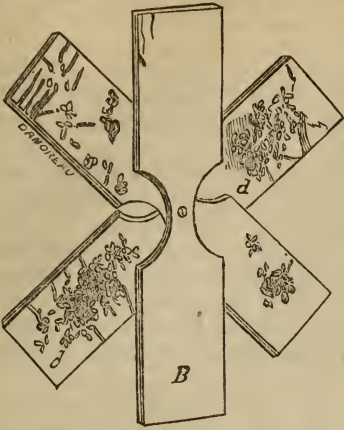
Mr. Thomas Wier, of Lacon, Ill., has hit upon a very simple device for alluring apple-worms, which is destined to play an important role in counterworking their injuries.

The trap (see figures *A* closed, *B* open) consists of two, three, or more thin pieces of boards, 12 to 20 inches in length, and 2 to 4 inches wide, with a screw (*a*) through their centre. The screw must be long enough to be firmly driven into the trunk of the tree, so as to hold the boards in position. The boards are cut out on each side of the screw, as at *c*, to facilitate their separation when fastened together by the silken threads of the worms, and to better expose the latter when the trap is opened.

The advantages of this trap so far outbalance the disadvantages that it may be considered the best we yet have. These advantages may be stated as follows: It is cheap, accessible to all, easily placed on the



tree, and removed again ; wood forms, perhaps the most natural covert for the worms ; the traps may be collected with little trouble, by the barrowful, submitted to a killing heat, in one way or another, and re-placed again ; they may be used on the ground as well as on the tree. Its disadvantages are few. One it has, in common with all other snares or traps for this insect, namely, that it can never *exterminate* the Codling-moth, for many reasons that will suggest themselves to all who have any acquaintance with the insect. Another is, that where one trap only is used it can be attached to but one side of the tree, and in this single respect, notwithstanding all the theories of my friend Wier, it must always be inferior to any trap that encircles the tree.



The worms will spin their cocoons between the inner shingle and the tree as freely as between the shingles themselves, and I suspect that it will be found less tedious and cheaper to detach the traps and kill the worms by wholesale, than to open them on the tree.

Those who prefer the latter method, will be pleased to learn of the means described by Mr. Wier, who says : "The quickest and best way to do this is to have a large tin pan bent in on one side, so as to fit closely to the trunk of the tree. When you reach the tree, drop upon your knees, place the depression in the pan against the trunk of the tree, hold it there by pressing your body against it, and you have both hands free to open the trap. When opening it, many of the pupæ or chrysalids will fall into the pan, and some of the worms. Kill the rest, or scrape them into the pan. The trap must be turned clear around, as many will be found between it and the bark of the tree. A person will open and kill the worms in from 400 to 800 traps in a day." I have known one of these traps to be so thoroughly torn to pieces by the Downey Woodpecker, that if they are to be preserved from year to year, it would be dangerous to leave them on the trees during winter.—*Riley's Report on Insects.*

LETTER OF HENRY MOYLE, of Paris, concerning an unusual variation occurring in the apple.

September 21st, 1872.

DEAR SIR,—You may perhaps remember that, at the meeting of your association held at Hamilton early in 1871, Mr. C. Arnold, of Paris, exhibited an apple grown in my orchard, having the appearance of a russet of some variety, but from his report of the remarks by the members, they evidently doubted the correctness of his statement. I herewith send two specimens of the said fruit, picked by me this morning ; they are grown on a tree grafted with Spitzenburgh. The natural fruit was a large green sweet apple, the graft was set over twenty years ago, and this is the third season I have seen this description of fruit on the same branch of that graft, and the only one on the tree that has any like it. That branch has always borne similar fruit, since I first noticed it about six years ago. The branch from which the apples were taken strikes off the main limb of the graft 18 inches, or two feet from where the scion was inserted. About the same distance from the beginning of the said branch apple No. 1 was picked, there were three just alike on a small spur ; further up at top of the branch were eleven others, all like Nos. 2 and 3. I shall let them stay on the tree as long as I can, so that any person can see them if they desire to do so.

The first season I noticed them I showed the apple to my neighbour, Mr. Wm. Smith, who pronounced it a Bourassa. In the spring of 1871 I let Messrs. Smith, Arnold and Hamilton, have some grafts cut from that particular branch, to see what the product will be. There has not been time to ascertain that yet. I should have been pleased to meet you at your meeting next week, but cannot get down, being on the jury for the Assizes in Brantford.

I am, Sir, yours truly,

HENRY MOYLE¹

LOWVILLE, NELSON TOWNSHIP.

MR. SECRETARY,—I feel it incumbent upon me to do the best I can to represent this locality in fruit growing.

THE CODLING MOTH,

With the exception of picking up or destroying the fallen fruit, has never been assaulted by strategy or force of arms. On this head, therefore, we have much to receive from, but little or nothing to impart to, the Association.

The moth is abundant and active in this neighbourhood. His operations are, for the most part, confined to those varieties of the apple that have a sweet or vinous flavour, such as the Tallman sweet Wine apple, Dominie, Rambo, Black Detroit, &c., &c. In this respect he shows his capacity for civilization; the wild crab being, if I mistake not his natural food. His notions of meum and tuum are likewise proofs of what civilization can effect for small as well as big bugs. Any one who has seen him poke his long politician nose with the utmost *nonchalance* into other people's affairs, puncturing without compunction what does not belong to him, must be convinced of this, and that the said curculio is a progressionist.

My pear trees, about 30 in number, all standards but one, have not yet fruited. Pear culture here is in its infancy. It, however, seems to promise well. I have not heard of any blight.

Plum culture, for a while abandoned, is reviving. A few years ago the knot made such havoc of all the old sorts that I rooted all out, and commenced de novo with the wild plum for stocks. I expect fruit next year, and also war with the "Little Turk."

The strawberry, most profitable for general market, seems to be Wilson's Albany, and its popularity may continue, till the taste of consumers is raised above the level of a strawberry, if large and cheap as a strawberry, and therefore sufficient for its place. I am cultivating a strawberry, said to be a seedling, sent me by a friend, that thus far seems about equal to the Wilson, in productiveness, and incomparably its superior in flavour.

It may not be out of place to mention my experience in gooseberry and currant culture, so far as it relates to the

CURRANT WORM.

I have three small plantations of gooseberries and currants; one where the fowls frequent, the others at a distance, where they never go. The former, in addition to being exposed to the visits of the fowls, have been treated to hellebore, &c. The worms on the distant plantations have been left to their own evil ways, and I believe have, in consequence, as is usual in such cases, come to grief. The facts added to the foregoing are as follows:—The first year of the advent of the worm all the bushes were about equally attacked, and the second, and the year before last the evil culminated in the bushes being nearly killed. Last year there was a marked diminution of the enemy upon the plantations, which were not reached by the fowls, nor "doctored" in any way. This year they have given me a most abundant crop. My opinion is, therefore, that if the worms are left to themselves the wolves and tigers of their own class will sooner or later restore the lost balance. That the fowls, and perhaps the poisons applied, destroy the said wolves and tigers, and thereby deprive us of our best, because "most natural allies in this war." My McLaughlin plum is doing well. The Hales early peach, by help of special treatment, and tonics, is beginning to show life.

I have the honour to be, yours, &c.,

S. P. MORSE.

REPORT ON PEAR CULTURE.

THE GRANGE, TORONTO, 17th June, 1872.

D. W. BEADLE, ESQ.,

Secretary, &c.

SIR,—As I may not be able to attend the Guelph meeting of the Fruit Growers Association in July, I write to say that though I have some three hundred pear trees

and fifty or sixty plums, I have suffered during the last three years, but very slightly, from pear blight or black knot—last year, which was fatal to pear trees in many gardens, I only lost one, and I attribute the absence of pear blight from my garden entirely to the use I have made of lime rubbish around each of my pear trees. Some two years ago I placed a wheelbarrow full of lime rubbish, got from an old building that was pulled down—the effect has been, I think, to sweeten the clay soil (mine is a heavy clay loam), which is, in some places, impregnated with iron—and it also, I think, gives strength to the trees to resist the effects of the blight. Last winter, which was very severe on trees, I only lost one pear, and that was transplanted last year.

I have treated my plums exactly as I have done my pears, and though I was troubled in all my young trees with the black knot before the application of lime, it seems entirely to have left my garden where the lime is used. If you think these observations of mine worth laying before the meeting for discussion, you can do so.

A friend of mine in Toronto lost last year ten or twelve of his finest bearing pears from blight, and when I showed him how I had escaped he agreed with me, thinking it was entirely due to the presence of lime.

I can account for the absence of blight and black knot in my trees in no other way.

I fear the vine you sent me was as dead as Othello himself; it shows no sign of reviving. Many of my native grapes in sheltered situations last winter were killed, whilst others in the open ground were all right in the spring. My peaches, under glass, lost all their bloom, or rather had none, but some under a wooden roof, where the sun could not get to them freely, do well.

My grapes in the vinery, well covered, have heavy loads of fruit. Mr. McPherson, I understand, lost all his peaches and vines, under glass.

Yours truly,

W. H. BOULTON.

DIGEST OF ANSWERS RETURNED TO QUESTIONS SENT OUT BY THE FRUIT GROWERS' ASSOCIATION FOR THE YEAR 1872.

Replies were received from thirty-four counties, which are arranged in this digest in such a manner as to make the information obtained from them most readily available to those who may be intending to plant fruit trees in any part of the Province.

COUNTY OF BRANT.

CHERRIES.

The crop of Cherries this year has been on the whole quite equal to the average. The varieties grown are the Black Eagle, Black Tartarian, Mayduke, Bigarreau or Yellow Spanish, White Heart, Governor Wood, Common Red, Downer's Late Red, American Amber, Black Heart, Napoleon Bigarreau, Early Purple Guigne, Elton, Archduke, and Early May. The Napoleon Bigarreau is highly esteemed on account of its size and good quality; the Black Tartarian, Yellow Spanish, and Downer's Late Red, because they are very prolific; one tree of the latter sort bore 250 quarts this season. The black and red varieties seem to sell the best. Those sorts that ripen earliest are most attacked by the birds, though one gentleman remarked that the light coloured varieties were less subject to their attacks, and another, that the common red was the least troubled. No varieties wholly escape their attentions.

RASPBERRIES.

The varieties grown are Brinckle's Orange, Black Cap, Philadelphia, Fastloff, Red and Yellow Antwerp, Franconia, Doolittle's Black Cap, Mammoth Cluster, Davison's Thornless, and Arnold's Orange King. Of these, the Brinckle's Orange, Black Cap, Philadelphia, Red and White Antwerp, and Mammoth Cluster are all named as being very prolific. The most hardy are the Doolittle's Black Cap, Philadelphia, Davison's Thornless, and Arnold's Orange King. The Mammoth Cluster has proved to be very pro

ductive; most think it to be very good and valuable: one thinks it lacking in flavour, and another does not think much of it. It is reported to be perfectly hardy by all who have had it long enough to test its hardihood, with the exception of Mr. John Arnold who says it is not hardy. The plants seem to be generally quite free from insects, occasionally the borer is mentioned, and an insect perforating and girdling the stalk so that it breaks off.

BLACKBERRY.

The early Wilson Blackberry had been fruited only by a very few; one or two spoke well of it, but Mr. John Arnold said it was a humbug, and Mr. Grace calls it a nuisance. Two or three say it is hardy, but the majority speak of it as being quite tender.

PEARS.

The following varieties are grown in this county:—Bartlett, Belle Lucrative, Winter Nelis, Flemish Beauty, Duchess d'Angouleme, Clapp's Favourite, Beurre d'Anjou, Beurre Clairgeau, Glout Morceau, White Doyenne, Vicar of Winkfield, Louise Bonne, Brandywine, Buffam, Beurre d'Amanlis, Beurre Langelier, Grey Doyenne, Dearborn's Seedling, Howell, Jargonelle, Lawrence, Madeleine, Osband's Summer, Seckel, Tyson, Clapp's Favourite, Swiss Bergamot, Henry the Fourth, and General Negley. But a few complain of having their trees injured by the blight this season. The varieties which suffered were the Flemish Beauty, Glout Morceau, Duchess d'Angouleme, and Winter Nelis. The weather previous to the appearance of the blight was very hot and dry; the trees in most cases made a good growth, though, in one instance, the growth was but little; the tree having been transplanted the previous year.

APPLES.

The varieties grown are the Northern Spy, Gravenstein, Early Rose, R. I. Greening, Fameuse, Early Joe, Ribston Pippin, Maiden's Blush, Early Harvest, Red Astrachan, Baldwin, Newton Pippin, Esopus Spitzenburgh, Keswic Codlin, Roxbury Russet, Red Canada, Fall Pippin, Swaar, Golden Russet, Seeknofurther, King of Tompkins County, Pomme Grise, Talman Sweet, Autumn Strawberry, Yellow Bellefleur, English Russet, Hawley, Hawthornden, and Summer Queen. These only are mentioned, though some reply indefinitely that they grow a large number, even as high as a hundred varieties. Those spoken of as most esteemed are the R. I. Greening, because it is productive and saleable: Duchess of Oldenberg, Red Astrachan, and Primate for Summer; Gravenstein, Hawthornden, Keswic Codlin, St. Lawrence, Cayuga Red Streak, Alexander, Chandler and Golden Sweet for Autumn; Baldwin, Dutch Mignonne, Fameuse, Hubbardston Nonsuch, King of Tompkin's County, Norton's Melon, Northern Spy, Newtown Pippin, both the Yellow and Green, Ribston Pippin, Golden Russet, English Russet, Esopus Spitzenburgh, Westfield, Seeknofurther, Talman Sweet, Vandervere and Wagoner for Winter; also Peck's Pleasant. The Codlin worm has generally been less injurious the past season. Very little effort has been made to destroy this insect, the only thing done by anyone has been to gather the fallen fruit. The straw rope trap has not been tried at all.

PLUMS.

The varieties cultivated are the Columbia, Washington, Jefferson, Lombard, Common Blue, Imperial Gage, Orange, Duane's, Purple, Diamond, Victoria, Brevoort's Purple, Prince's Yellow Gage, Red Magnum Bonum, Smith's Orleans, Pond's Seedling, Italian Damask, Green Gage, Coe's Golden Drop, Huling's Superb, Purple Gage, and Damson. They ripen in August, September, and October. The Lombard is the most productive of them all, and most esteemed as a market variety, though the Yellow Gage is named by several, and the Pond's Seedling and Duane's Purple are mentioned by a few as being profitable for market. The black knot is not very bad. The only remedy attempted has been that of amputation, which has partially succeeded. The Curculio has been less troublesome in some orchards than usual, while, in others, it has been quite abundant. Mr. Cowherd caught 1284 this year, commencing on the 30th of May and ending on the 7th of

June, by jarring the trees, which is the usual remedy practised, and in most cases is quite successful.

EUMELAN GRAPE.

Several of the vines have died, one member had fruited it, and was pleased with its early ripening, and one had found it to mildew.

STRAWBERRIES.

They do not seem to be very subject to insects; two members spoke of a leaf roller that gave some trouble, and one replied that some years a small green worm on the under side of the leaf ate it full of holes, but he could not find it on the berries. It increased rapidly, and soon stripped a bed when once it began.

FROSTS.

The fruit was not injured by Spring frosts. The first Autumn frost was on the 2nd October, and the first ice on the 11th October at Newport. At Cainsville the first ice in the last week in September. At Brantford, beans and tomatoes were unhurt October 7th and 10th, nor was there much injury before the 30th. At Mohawk, there was a slight frost on the 4th and 16th September, and on the 11th and 12th October ice formed. At Paris, dahlias were uninjured until the 11th October.

WINTER.

At Mohawk the vines were injured. At Brantford, one member says the Isabella vines were badly winter-killed; and another, that several of his evergreens were ruined by continued western winds. Beyond this, there does not seem to have been much injury.

SHELTER.

Mr. Cowherd planted a belt of White Pine in 1860 which now averages twenty feet in height, also a Willow Hedge on the north side now twelve feet high; but, planting for shelter is not at all general. A few have planted Norway Spruce and Scotch Pine.

BIRDS.

The Wax-wing Chatterer, Red-headed Woodpecker, Robin, and Catbird are mentioned by several, while others think the birds do more good than harm.

FRUIT UNDER GLASS.

Jabez Rowe has a cold vinery and cultivates in it Black, Victoria, Golden, Muscat, and Purple Hamburg, Duchess of Buccleuch, Muscat of Alexandria, and Royal Muscadine, with other sorts planted this Spring. James Little, South Dumfries, has the Black Hamburg, Sweet Water, Black Prince, Canadian Chief, Golden Chasselas, and Black St. Peter; these bear full crops every year, but the Black Hamburg is the best for market.

COUNTY OF BRUCE.

CHERRIES.

The Common Kentish has been a good crop. The Kentish and Mayduke are those chiefly grown. The Mayduke is highly esteemed and promises to do well.

RASPBERRIES.

Red and white sorts are cultivated, but the names are not known, and very little attention seems to have been given to this fruit.

PEARS.

The Flemish Beauty, Beurre d'Anjou, Louise Bonne, White Doyenne, Brandywine, and Bartlett, are grown.

APPLES.

Early Harvest, Vandevere, Red Astrachan, Sweet Bough, Duchess of Oldenburgh, Tart Bough, Fall Pippin, Fall Janetting, Gravenstein, St. Lawrence, Snow, Colvert, Golden Russet, King of Tompkins, Spy, Pomme Grise, Rambo, R. I. Greening, Rox Russet, Talman Sweet, Bailey's Sweet, Yellow Bellefeur, Hawthornden, Hubbardston's Nonsuch, Jonathan, Esopus Spitzenburgh, Maiden's Blush, Dominie, Westfield Seek-no-further, Twenty-ounce apple, and Ribst n Pippin are grown.

Those most highly esteemed are the Red Astrachan, Sweet Bough, Duchess of Oldenburgh, St. Lawrence, Snow, Golden Russet, Hawthornden, Ribston Pippin, Jonathan, Maiden's Blush, Northern Spy and Roxbury Russet, because they all seem to be hardy, and to thrive well.

PLUMS.

Lombard, Washington, Yellow Egg, and Damson are grown; the Lombard is the most productive and most profitable for market. No Black Knot and very little Curculio in this section.

EUMELAN GRAPE.

Has not yet fruited, is hardy, and without any appearance of mildew.

FROSTS.

The fruit was not injured by Spring frosts. On the 2nd, 14th and 15th September there was frost, but it did no injury.

SHELTER.

Balsams and Pines have been planted on the north side of the orchard with success by John Hall, Pinkerton.

COUNTY OF CARLETON.

RASPBERRIES.

The Am. Black Cap, Mammoth Cluster, Fastolf, Brinckle's Orange, Philadelphia, and White Antwerp are grown. Of these the Am. Black Cap and Philadelphia are the most productive, the Brinckle's Orange most esteemed for sweetness and high flavour. The Philadelphia and Black Caps are the most hardy.

PEARS.

The Seckel, Flemish Beauty and Summer Bonchretien are grown; but little attention, however, seems to have been given to the growing of pears. The climate seems to be too severe for most sorts, some complaining that their trees die.

APPLES.

The R. I. Greening, Pomme Grise, Colvert, Fall Jenneting, Red Astrachan, Baldwin, Fameuse, Hawthornden, Gravenstein, Wagner and Golden Russet are grown about Ottawa. W. P. Taylor, at Fitzroy Harbour, says, the only variety he has had any success with is the Fameuse, and this success has been so unsatisfactory as to be almost a failure. "The trees suffer from frost, but worst of all, branch after branch dies from being diseased in a fork, bark blackened and extending over limb. I am now trying Red Astrachan, but this too suffers in winter, and has not yet fruited. Crabs alone appear to be hardy."

PLUMS:

The Lombard, Duane's Purple, Washington, Jefferson, Coe's Golden Drop, Yellow and Imperial Gage, Peach Plum and McLaughlin are grown.

The Lombard and Jefferson are the most productive.

Mr. Bucke says the Curculio is not known about Ottawa.

FROSTS.

No injury done by late Spring frosts this year. The first frost at Ottawa was on the 5th October, when the thermometer fell to 32°. The second was on the 12th, the thermometer falling to 26°.

WINTER.

The Elkhorn Cherry and Ribston Pippin Apple, and Evergreens were injured by the severity of the winter. Mr. Bucke says that his grape-vines were severely injured by the cold, although all were covered with earth. He lost one Telegraph, one Concord (the largest and healthiest vine in the garden,) and one Adirondac. The crop on those that survived was from one-half to one-third what it should have been. "My soil is a light, sandy loam, and though well underdrained, I think, when I compare notes with other vine-growers in this vicinity, the frost penetrates sand more than a well-drained clay soil."

SHELTER.

No systematic planting for shelter seems to have been tried.

BIRDS.

Some say the Wax-wing and Red-headed Woodpecker, others that none are injurious, and wish they had more.

FRUIT UNDER GLASS.

Black Hamburg, Rose Chasselas, West's St. Peter, Royal Muscadine, and White Frontignan are grown.

COUNTY OF DURHAM.

CHERRIES.

At Tyrone and Bowmanville the crop was very deficient; at Millbrook and Cavan it was about an average. The varieties grown are Kentish, Gov. Wood, Black Tartarian, Napoleon, Yellow Spanish, Knight's Early Black, Elton and Downer's Late. The Napoleon is esteemed because of its size, and Downer's Late, because it is an abundant bearer and ripens late. The earlier varieties are most eagerly sought by the birds.

RASPBERRIES.

White and Red Antwerp and Franconia are grown. The Franconia is the most productive and hardy. Mr. Coleman, of Bowmanville, lost the Mammoth Cluster by the severity of the winter.

PEARS.

The Bartlett, Flemish Beauty, White Doyenne, Louise Bonne de Jersey, Autumn Paradise, Duchess d'Angouleme, Onondaga, Winter Nelis, Vicar of Winkfield, and Summer Bonchretien are grown. No pear blight this season. Mr. Coleman, Bowmanville, never saw the blight in any of his trees.

APPLES.

The Swaar, Fall Pippin, Alexander, Beauty of Kent, Cooper's Early White, Red Astrachan, King of Pippins, Snow, Spy, St. Lawrence, Spitzenburgh, Ribston Pippin, Talman Sweet, Sweet Bough, Wagener, Autumn Strawberry, Yellow Bellefleur, Roxbury Russet, Golden Russet, Pomme Grise, Golden Sweet, Summer Pearmain, Early Harvest, Duchess of Oldenburgh, Baldwin, Early Joe, Colvert, Fall Jeneting, Jersey Sweet, Porter, Pumpkin Russet, Fameuse, Green Sweeting, Jonathan, King of Tompkins County, Lady's Sweet, Monmouth Pippin, Newtown Pippin, Rawle's Janet, Rambo, Canada Reinette, R. I. Greening, Seek-no-further, Talman Sweet, Twenty-ounce, Winesap and Willow Twig are grown.

The Red Astrachan, Golden Russet, Snow, St. Lawrence, Spy, King of the Pippins, Alexander and Greening, Duchess of Oldenburgh, Early Harvest, and Colvert, are most es-

teemed because of their productiveness, hardihood, and good quality of fruit, either for cooking or dessert.

The Codlin worm has been very bad in many parts of the county this season, and injured the fruit greatly. No effort has been made to destroy either the moth or worm.

PLUMS.

The Magnum Bonum, Egg Plum, Peach Plum. Washington, Smith's Orleans, Green Gage, Prince's Yellow Gage, Columbia, Lombard, Imperial Gage, Reine Claude de Bavay, Coe's Golden Drop, McLaughlin, Orange Plum, and Jefferson are grown. The Green Gage, Smith's Orleans, Yellow Egg, Reine Claude de Bavay and Columbia are the most productive, and the Lombard, Columbia, Smith's Orleans, Washington, and Yellow Egg are the most profitable. Little or no Black-Knot. John McLaughlin says that he is able to control the black-knot by cutting it off as early in the season as it appears, and that Prince's Yellow Gage has not shown any symptom of the knot for the past fifteen years. The curculio has not been very troublesome in this County, and is easily kept within bounds by jarring the trees, and keeping poultry under them.

FROSTS.

The apples were injured at Millbrook by a frost the first week in June. At Bowmanville the cherries were all destroyed, except Kentish and Downer's Late Red. Plums and apples injured, but not so severely. The first frosts that injured vegetation were from the 11th to 14th October.

WINTER.

The grape vines were about three-fourths killed back last winter, and the blossom buds of the plum were nearly all killed. Mr. McLaughlin had four trees of the Swaar, and two of the Greening badly injured by frost in March.

SHELTER.

The spruce and balsam have been planted in a few instances for shelter.

BIRDS.

The Wax-wing, Robin, Woodpecker and Blue Jay are thought to be injurious.

COUNTY OF ELGIN.

CHERRIES.

The crop was hardly an average this year. The Mayduke, Kentish, Gov. Wood, Elton, and Black Heart are grown. The Kentish is highly esteemed because of its productiveness and hardihood. The early sorts are subject to be eaten by birds.

RASPBERRIES.

The Philadelphia, Franconia, Naomi, White Antwerp and Black Cap are cultivated. The Philadelphia is most productive, and with the Black Caps the most hardy. Not much subject to insects.

BLACKBERRY.

The early Wilson seems to be hardy, and the fruit large and good, well worthy of cultivation.

PEARS.

The Duchess d' Angouleme, Louise Bonne de Jersey, Bartlett, Seckel, Madeline, Brandywine, Swan's Orange, Osband's Summer, Sheldon and Buffam are grown. The blight has not been serious the past season. The Madeleine and Steven's Genesee suffered most from blight, the weather was very wet in June, dry in July and the blight appeared in August. The trees grew about ten inches the previous season.

APPLES.

The R. I. Greening, Golden Russet, Cayuga Red Streak, Spitzenburgh, Rambo, Red Astrachan, Baldwin, Talman Sweet, Smoke-house, Snow, Keswick Codlin, Golden sweet and all the leading varieties.

Of these the R. I. Greening is very valuable on account of its productiveness and good quality, the Red Astrachan commands better prices than other apples of the same season, and the Baldwin keeps and sells well. The Codlin Moth has been more than usually injurious the past season, and nothing seems to be done to lessen their numbers.

PLUMS.

The Lombard, Coe's Golden Drop, Jefferson, Damson, Yellow Egg, Washington and Imperial Gage are grown. The most productive are Lombard, Washington and Imperial Gage, and hence the most profitable. The Black Knot has not been troublesome. The curculio is destroyed by jarring and killing, and the result is a good crop of plums.

EUMELAN GRAPE.

One member says that it is quite hardy, and another that it was very subject to mildew ; proved the most tender out of seven sorts and finally died.

FROSTS.

At Mount Salem there was frost from the middle to the 20th of May which destroyed the Grapes, Peaches and Plums, and the Apple suffered. This also was the case at Union. Elsewhere in this County there seems to have been no injury from spring frosts. In the fall the first frosts that injured vegetation occurred from the 27th September to the 10th October.

WINTER.

The Isabella was killed at Port Stanley, some Delaware at Mount Salem : Isabella and Rogers No. 3 killed at Union.

SHELTER.

A few are planting Pines and other trees for shelter.

BIRDS.

The Wax-wing, feathers of which were sent to the Secretary, is very destructive to cherries, raspberries and blackberries. Some, however, thought that though the birds devoured fruit they were on the whole more serviceable than injurious.

COUNTY OF FRONTENAC.

CHERRIES.

The crop was bad this year. The Kentish is the variety mostly grown.

RASPBERRIES.

The White and Red Antwerp, Brinckle's Orange, Philadelphia, and Clarke and Black Caps are grown. The Doolittle, Mammoth Cluster and Clarke are the most productive. The Mammoth Cluster is good and productive, and tolerably hardy. Injuries from insects are but slight.

BLACKBERRY.

The Early Wilson seems to be very tender.

PEARS.

The Bartlett, Louise Bonne, Flemish Beauty, Seckel, Steven's Genesee, and some others are grown. The Louise Bonne, Duchess d' Angoulême, Beurre d' Anjou and

Glout Morceau suffered badly this year from a frost which occurred on the night between the 4th and 5th of June, causing the fruit to drop off. Trees made very little growth during the summer of 1871, and less in that of 1872, owing to the drought.

APPLES.

The Golden Russet, Fameuse, Spy, R. I. Greening, Wagener, Early Harvest, St. Lawrence, Pomme Grise, Ribston Pippin, Red Astrachan, and many others are grown. Of these Golden Russet, Snow, Spy and St. Lawrence are most esteemed because they sell readily. The Codlin moth is troublesome and on the whole worse than during former years. No pains have been taken to destroy the insect.

PLUMS.

The Egg Plum, Orleans, Pond's Seedling, Coe's Golden Drop, Imperial Gage, Blue Plum and Washington are grown. These all do well at Kingston. The Black Knot has been very troublesome, the only remedy attempted has been cutting out, but not always with success. The curculio has been troublesome, but jarring the trees has been quite successful in capturing the insect and securing a crop of fruit.

THE EUMELAN GRAPE

Has been fruited by Francis H. Horsa, and he says that "the bunches are loose and irregular." I exhibited it and obtained a first prize at our County Show. The flavour is certainly superior—finer than Rogers No. 9, sweet and pure, much admired by all who tasted it. The only drawback is the smallness of the bunches and berries. Perhaps these will improve, if so, it will be a beautiful grape." His vine bore thirty bunches. The vine seems to be hardy, fruit ripened fully by the 20th September, and there was no appearance of mildew.

FROSTS.

The Autumn frosts commenced the first week in October; up to that time there had not been any to injure vegetation about Kingston.

SHELTER.

Cedar and Maple trees have this year been planted along the roads by the Township Council. Note. This is a step in the right direction, and well worthy of imitation by every Township Council in the Province.

BIRDS.

The Wax-wing, Robin, and Woodpecker are named as injurious to the fruit grower; but Mr. Hosra says:—"We want more birds, and penalties stringently enforced against those who destroy them. Birds are the only truly effectual insect exterminators. The cabbages have been greatly destroyed around here this year by the caterpillar of the *Pontia Rapæ*, which has quite swarmed. In England, the natural enemy of this insect is the Titmouse, *Parus Cœruleus*. Could not the F. G. Ass. turn their attention to this, and devote some of their funds to the importation of the titmouse, and some of the other soft-billed birds—the Robin, Hedge-creeper, and others? They might, perhaps, prove hardy enough to stand the winter in the County of Essex, and along the shores of Lake Erie, and would, probably, in time, become migratory in their habits, wintering in the South, and revisiting us in the spring, when we mostly want them. I have no faith in any attempt of man being able to check the growth of insect life."

FRUIT UNDER GLASS.

One gentleman says he grows Grapes and Peaches under glass but does not name the sorts.

COUNTY OF GREY.

CHERRIES.

This fruit is not very generally cultivated. Those who have trees said the crop was light. The Kentish, Mayduke, Belle de Choisy, and Reine Hortense are grown; the Mayduke is preferred.

RASPBERRIES.

The Clarke, Red and White Antwerp, Mammoth Cluster are grown. The Antwerp and Mammoth Cluster are the most productive. All are hardy enough, if covered with snow during the winter.

BLACKBERRY.

But few have planted the Early Wilson. Those who have it say that it is hardy.

PEARS.

The Brandywine, Flemish Beauty, Louise Bonne, Duchess d'Angouleme, Beurre Diel, Seekel, Vicar of Winkfield, Bartlett, Buffam, Lawrence, Glout Moreau, White Doyenne, Oswego Beurre, Winter Nelis, and Beurre d'Anjou are grown. The pear is but sparingly cultivated, and not much is known about the pear blight.

APPLES.

The Twenty-ounce Pippin, Rambo, Baldwin, R. I. Greening, King of Tompkin's County, Bellefleur, Fall Pippin, Golden Russet, Colvert, Ribston Pippin, Snow, St. Lawrence, Kentish Fillbasket, Rox Russet, Early Harvest, Red Astrachan, Esopus Spitzenburgh, Keswic Codlin, Spy, Fall Jeneting, Gravenstein, Vandervere, Chandler, Blue Pearmain, Maiden's Blush, Tart Bough, Alexander, Colvert, Monmouth Pippin, and Pomme Grise, are grown. Of these, Early Harvest and Red Astrachan are most esteemed for summer; Snow apple for early winter. The Vandervere is a heavy and regular bearer, and excellent keeper. R. I. Greening bears and keeps well, and the Baldwin is a good bearer. The Codlin moth prevails very injuriously in some parts of the County, while in other parts it seems not to be known. Nothing seems to be done in the way of destroying them.

PLUMS.

The Bingham, Bleeker's Gage, Coe's Golden Drop, General Hand, Imperial Gage, Lawrence's Favourite, M'Laughlin, Yellow Egg, Washington, Bradshaw, Lombard, Smith's Orleans, Pond's Seedling, Victoria, Duane's Purple, Jefferson, Columbia, Saint Catherine, Magnum Bonum, and Green Gage, are grown. Of these, the most productive are the Lombard, Yellow Egg, and Coe's Golden Drop; and the Yellow Egg, Lombard, Washington, and Columbia are the most profitable. The Black Knot is not troublesome, nor the Curculio.

THE EUMELAN GRAPE.

Ripened the 12th September; think well of the fruit; not subject to mildew; generally found to be hardy.

FROSTS.

No late spring frosts this year. On the 28th Sept., a frost killed potato and pumpkin vines at Clarksburgh. In Collingwood Township, frost injured foliage on the 15th September. Generally, however, there were no severe frosts before the 10th October.

WINTER.

Robt. J. Smith, of Owen Sound, lost one-third of his apple trees by the cold. At Clarksburgh, the peach trees had their fruit buds killed. The Delaware Grape, at Owen Sound, was injured.

BIRDS.

The Wax-wing, Robin, and Woodpecker eat the cherries and small fruits.

COUNTY OF GLENGARRY.

CHERRIES.

Very few are grown, and these do not seem to bear.

RASPBERRIES.

The Mammoth Cluster is the only one mentioned, and this seems to be hardy, and not subject to insects.

PEARS.

The Flemish Beauty, Beurre Clairgeau, and Beurre d'Anjou are the only sorts named. The Flemish Beauty is spoken of as hardy.

APPLES.

The Red Astrachan, Snow, and Alexander are named, and seem to be quite hardy. The Red Astrachan commences to ripen about the 15th August. The Codlin Worm has been worse than usual this year.

PLUMS.

The Imperial Gage, Jefferson, Green Gage, and M'Laughlin are cultivated.

FROSTS.

No injury this year from spring frost. The first frost occurred the 2nd and 3rd Sept., but did no injury; the next on the 3rd or 4th Oct.

WINTER.

The Concord, covered with potato tops, was killed by the winter, while the Delaware, Ontario and Isabella, covered in the same way, escaped.

COUNTY OF GRENVILLE.

CHERRIES.

The crop this year has been poor: the Mayduke and Morello are the only kinds that will stand the winter.

RASPBERRIES.

The White and Red Antwerp, Clarke and Philadelphia are grown, the latter being the most productive and the most hardy.

PEARS.

The Flemish Beauty, Beurre d'Anjou, Lawrence, Sheldon, Onondaga, White Doyenne, Bartlett, Beurre Hardy, Louise Bonne, Belle Lucrative, Winter Nelis, Washington, and Osband's Summer are cultivated

APPLES.

The Red Astrachan, Fameuse, Bourassa, Ribston Pippin, Golden Russet, Pomme Grise, William's Favourite, Duchess of Oldenburgh, Gravenstein, Baldwin, King of Tompkins County, Porter, Spy, Swaar, Canada Reinette, St. Lawrence, Dyer, Early Harvest, Talman's Sweet, Spitzenburgh, and Blue Pearmain are grown. Preference is given to the Duchess of Oldenberg and Early Harvest; because they are not injured by the Codlin Worm, and are productive. The Codlin worm has destroyed nearly all the apples near Prescott this season. Gathering up the fallen fruit is the only means used of destroying this worm.

THE EUMELAN GRAPE.

Fruited this year for the first time. Vine hardy and free from mildew.

FROSTS.

The fruit crop was not injured this year by late spring frosts.

WINTER.

The severe cold of last winter injured the Duchess of Oldenburgh, Golden Russet and Baldwin. The bearing limbs were killed.

SHELTER. }

Mr. James Irwin has planted a willow hedge, which answers a good purpose.

COUNTY OF HALDIMAND.

CHERRIES.

At Cayuga the crop has been good ; in other places poor. The varieties grown are the Bigarreus and Dukes and the Kentish. The earliest varieties are most subject to attacks of birds.

RASPBERRIES.

Red and Yellow Antwerp and Philadelphia are grown.

PEARS.

Louise Bonne, Flemish Beauty and Seckel are cultivated. Also Sheldon, Ananas d'Ete, Beurre d'Anjou, Winter Nelis, Albertine, Onondaga and Belle Lucrative.

APPLES.

All the leading varieties are grown, the Spy and Spitzenberg are most esteemed. The Codlin worm is about as usual.

PLUMS.

The Black Knot has not been very troublesome, and is kept in check by cutting it out as soon as it appears. The Curculio has not been as bad as usual this season.

THE EUMELAN GRAPE.

Is perfectly hardy and free from mildew.

FROSTS.

No late spring frosts this year. The first in the fall was on the 1st September and only injured the corn in low black turfy land.

WINTER.

Rogers No. 19 was badly cut down ; also Hartford and Concord. Rogers Nos. 3 and 15 were not much injured.

SHELTER.

The White Pine has been planted for shelter.

COUNTY OF HALTON.

CHERRIES.

The crop seems to have been hardly an average. The Kentish, Mayduke, Elton, Reine Hortense, Black Tartarian, American Heart, and Gov. Wood are grown. The common Kentish is much esteemed because it is hardy and reliable, and the Am. Heart for fine flavour. The birds attack all sorts, especially the Governor Wood.

RASPBERRIES.

The Yellow Antwerp, Fastolff, Black Caps, Clarke, Kirtland, Catawissa, Philadelphia, Franconia, Brinkle's Orange, Purple Cane, Mammoth Cluster, Davison's Thornless, and Golden Thornless. The most productive are the Franconia, Fastolff and Black Caps. The Fastolff and Black Caps are reported to be the most hardy. No serious injury from insects.

BLACKBERRIES.

The Early Wilson bears well and the fruit excellent. It killed back considerably last winter.

PEARS.

Duchess d'Angouleme, Beurre Clairgeau, Sheldon, Bartlett, Glout Moreceau, White Doyenne, Louise Bonne, Doyenne Sieulle, Steven's Genesee, Easter Beurre, Beurre d'Anjou, and Flemish Beauty, are grown. Not much pear blight this year.

APPLES.

The R. I. Greening, Baldwin, Rox Russet, Golden Russet, Spitzenburgh, Phoenix, Spy, Nonsuch, Fall Pippin, Gloria Mundi, Red Astrachan, Beauty of Kent, Rambo, Ribston Pippin, Colvert, Talman Sweet, Seek-no-further, Dominie, Gravenstein, Early Harvest, Swaar, Bellefleur, Twenty-ounce Pippin, Snow, Holland Pippin, Sweet Bough, Keswic Codlin, Alexander, Hawley, Hawthornden, St. Lawrence, Maiden's Blush, Wagener, and Dutch Mignonne are grown. Those most esteemed are the Early Harvest and Red Astrachan, Keswick Codlin, Fall Pippin, Gravenstein, Baldwin, very productive. R. I. Greening, the best, considering quality and productiveness. Spy, good bearer, but specimens variable in quality. Seek-no-further keeps well. Russets hang well on the tree and sell well. The Codlin worm is very bad in some parts of the county, while in other parts less injurious than usual. The hogs are let in to eat the fallen fruit, and this seems to be all that is attempted in the way of lessening the number of this pest.

PLUMS.

The Washington, Jefferson, Lombard, Imperial Gage, Yellow Gage, Common Blue Damson, Wild Red, Magnum Bonum, Huling Superb, Duane's Purple are grown. The most productive are the Lombard and Magnum Bonum, and these are the most profitable for market. The Black Knot does not seem to be very troublesome: the remedy used is cutting out the knots. The curculio is not very abundant generally; those who have been most troubled have found jarring the trees a quite sure method of securing a fine crop of plums.

THE EUMELAN GRAPE

Has been fruited and thought to be a very fine sort.

FROSTS.

The fruit has not been injured by late spring frosts, except a few grapes injured on 23rd of April. On the 12th October the first severe frost occurred.

WINTER.

Ontario and Rebecca Grape vines killed to the ground. Adirondac, Diana, Isabella Catawaba and injured so that they did not bear. Hartford Prolific and Salem also injured, but bore some fruit. Clinton, Delaware and Concord not injured to any extent. All Cherry trees except the Kentish injured so that they did not bear full crops. The Peach blossoms were killed. Israella also injured. The Quince trees also suffered.

SHELTER.

The White Pine is planted, and Maple, and White Spruce.

BIRDS.

Woodpeckers, Robin, and Wax-Wing eat the Cherries and small fruits.

COUNTY OF HASTINGS.

CHERRIES.

The Cherry crop has not been good the past season. Only the common red and black sorts are grown.

RASPBERRIES, BLACKBERRIES and PEARS are not much grown. There was no blight on the Pear trees this year, but there was some last year.

APPLES.

The Spy, Golden Russet, Snow, Talman Sweet, Pippins and Wagener are grown. The Spy, Golden Russet and Wagener are much esteemed for their superior flavour and fineness. The Codlin Moth has been less injurious this season than usual, though no means seems to have been used for destroying the moths or worms.

PLUMS and GRAPES are not much grown, and no insects injure the Strawberries in plant or fruit.

FROSTS.

The first Autumn frosts occurred on the 4th and 9th of October, but did no material injury.

SHELTER.

There seem to have been no trees planted for shelter.

COUNTY OF HURON.

CHERRIES.

The crop has been on the whole very good. The Mayduke, Black Tartarian, White Heart, Early Richmond, White French Guigne, Ne-Plus-Ultra, Black Heart and Kentish are the varieties mostly grown. The Black Tartarian does admirably, the fruit is of first quality, and the Napoleon Bigarreau is very prolific; the Ne-Plus-Ultra is a seedling grown by John Mosely, of Goderich, and said by him to be very productive, and ten days later in ripening than any other sort. The Mayduke also is much esteemed. The early varieties are most liable to be eaten by birds. The White French Guigne is not attacked by birds.

RASPBERRIES.

The Red and White Antwerp, Brickle's Orange, Franconia, Philadelphia, Mammoth Cluster, are grown. Of these the Red Antwerp seems to be the most productive and this and the Philadelphia the most hardy. The Mammoth Cluster has been fruited by H. Hale, Clinton, who says it is good but inferior to the Antwerp. J. Mosely, Goderich and H. Hale, say it is hardy. A. M. Ross, Goderich, complains of the depredations of a small green worm, similar to that on Currants, completely eating the leaves.

BLACKBERRY.

The Early Wilson has proved hardy thus far, but has not yet been fruited.

PEARS.

The Flemish Beauty, Buffam, Bartlett, Beurre d' Amanlis, Belle Lucrative, Duchess d' Angouleme, Vicar of Winkfield, Golden Beurre, Beurre Diel, White Doyenne, Louise Bonne, Steven's Genesee, Swan's Orange, Howell, Beurre d' Anjou, Jargonelle, Seckel, Cushing, Dearborn's Seedling, Oswego Beurre and Glout Morceau are grown. The blight has been more severe on the whole the past season than usual. The Flemish Beauty Beurre d'Amanlis, Vicar of Winkfield, Bartlett, Steven's Genesee, Louise Bonne de

Jersey and the Glout Morceau have suffered most. The weather previous to the appearance of the blight, was hot and dry. The two seasons previous had been both hot and dry consequently the growth of the trees was moderate and the wood well ripened.

APPLES

The Early Strawberry, Primate, Early Harvest, Rambo, Sweet Bough, Snow, Pomme Grise, Wagener, Vandevere, Greening, Swaar, Porter, King of Tompkins, Baldwin, Hubbardston's Nonsuch, Hawley, Pomme Royal, Spy, Red Astrachan, Duchess of Oldenburg, Ribston Pippin, Golden Russet, Roxbury Russet, Romanite, St. Lawrence, Danver's Winter Sweet, Twenty Ounce, Yellow Bellefleur, Beauty of Kent, American Summer Pearmain, Hawley, William's Favourite, Maiden's Blush, Drap d' Or, Gravenstein, Alexander, Minister, Belmont, Esopus Spitzenburgh, Canada Reinette and Melon are grown. Those most esteemed are the Red Astrachan, Primate, Sweet Bough, Porter, Hawley, Pomme Royal, Snow, Pomme Grise, Baldwin, Hubbardston's Nonsuch, Ribston Pippin, Gravenstein, Greening, Spy, Golden Russet, Roxbury Russet, Early Harvest and St. Lawrence. The Ribston Pippin grown at Goderich by John Mosely, is there a long keeper, he has had the fruit sound and fresh and in full flavour as late as the 20th of August. The Codlin Moth has been more injurious in some orchards than last season, in others less. A. M. Ross has tried no other means of destroying this insect than carefully gathering up the fallen fruit, others do not seem to have tried any means whatever.

PLUMS.

The Lombard, Bingham, Jefferson, Conger's Scarlet, Washington, Goliath, Ickworth's Imperatrice, Victoria, General Hand, Pond's Seedling, Huling's Superb, McLaughlin, Bradshaw, Green Gage, Smith's Orleans, Imperial Gage, Bleeker's Gage, Royal, Diamond, Reine Claude de Bavay, Denniston's Superb, Peach Plum, Damson, Orange and Lawrence's Favourite are grown. The most productive and constant bearers are the Lombard, Smith's Orleans, Pond's Seedling, Victoria, Reine Claude de Bavay, Washington and McLaughlin. The Lombard is mentioned, with Smith's Orleans, Washington and Lawrence's Favorite as being most profitable. The Black Knot seems to be just making its appearance and has not been very troublesome. The remedy tried has been cutting it out as soon as it appears. The Plum Curculio made its appearance about Goderich three years ago and is increasing, but is not very general as yet through the County. Mr. Ross practises jarring the trees and succeeds in securing a good crop of Plums. No others speak of trying this means of catching the insect. Mr. Ross complains that the *Rot* in his Plums is much worse than the curculio and that he lost about half of his Plums the past season from this cause.

THE EUMELAN GRAPE.

Mr. Ross and H. Hale have fruited it and both think highly of it. Mr. Ross says it is a great bearer, perfectly hardy, no signs of mildew, good flavour and ripens early and esteems it the most promising of the new grapes.

FROSTS.

Mr. Mosely is the only person who thinks there was any injury from frost. He says that the buds of the Apple were materially injured by the dry frosts of January and February, and the frosts in the latter part of April.

At Goderich the first frost was about the middle of September but did no harm; at Clinton the first severe frost was on the 8th of October, while Mr. Ross had grapes and plums yet hanging in his garden as late as the fifth of November, uninjured by frost.

WINTER.

The fruit trees were not injured by the past winter, but some Antwerp Raspberries at Clinton were killed.

SHELTER.

Not much attempted in the way of planting trees for shelter.

BIRDS.

The Wax-Wing and Woodpeckers are complained of by some ; others think that on the whole they are more beneficial than injurious.

COUNTY OF LAMBTON.

CHERRIES.

The Heart and Bigarreau varieties do not seem to thrive very well, being generally killed by the frosts of winter ; the common Kentish does the best, but the crop was not very good the past season.

RASPBERRIES.

The Philadelphia, Clarke, Miami, Black Cap, Purple Cane, Brinkle's Orange, White Antwerp and Mammoth Cluster are grown by a few, but the cultivation of this fruit is very generally neglected, the wild varieties being abundant in many parts. Of these the Philadelphia, Clarke, Purple Cane and Black Caps are hardy ; the Philadelphia is very productive on sandy soil, the Black Caps on clayey loam. The Mammoth Cluster has been fruited only by a few, they think it good and hardy.

EARLY WILSON BLACKBERRY

Does not seem to be perfectly hardy, though generally passing through the winters without serious injury. But very few have fruited it.

PEARS.

The Bartlett, White Doyenne, Flemish Beauty, Dix, Grey Doyenne, Louise Bonne, Beurre Clairgeau, Duchess d' Angouleme, Buffam, Beurre d' Anjou, Tyson, Oswego Beurre, Easter Beurre, Jargonelle, Pound, Vicar of Winkfield, Seckel, Brown Beurre, Belle Lucrative, Lawrence, Prevost, Leon le Clerc of Laval, Winter Nelis, Graslin and Beurre Diel are grown. No blight reported at all from this County.

APPLES.

The Early Harvest, Red Astrachan, Snow, Fall Pippin, Baldwin, R. I. Greening, Golden Russet, Keswick Codlin, Early Strawberry, Colvert, Ribston Pippin, Esopus Spitzenburgh, Pomme Grise, Vandevere, Winter Pearmain, Swaar, Spy, Cayuga Red Streak, Wagener, Roxbury Russet and many others are grown. Those most esteemed are the N. Spy, Baldwin, Fall Pippin, Esopus Spitzenburgh, Yellow Bellefleur, Hubbardston's Non-such, Wagener, Roxbury Russet, Snow, Red Astrachan, R. I. Greening and Golden Russet. The Codlin Moth has been more injurious this season and in some places very numerous. Nothing is done to destroy them.

PLUMS.

The Blue Plum, Washington, Green Gage, Red Magnum Bonum, Smith's Orleans, Frost Gage, Damson, Imperial Gage, Yellow Egg and Columbia are grown. The most productive are the Columbia and Blue Plum. But very little seems to be done in the way of marketing the fruit. The Black Knot is scarcely known. The Curculio has not been as bad as usual the past season. Jarring the trees and destroying the insects seems to be very generally practised and with good results.

THE EUMELAN GRAPE.

Has proved to be hardy and free from mildew with T. C. Wheately, Sarnia, but small in bunch and berry. A. Vidal, Sarnia, says, his vine was injured by the winter. James Watson, Birkhall, thinks it inferior to many of the other kinds of Grape. J. Oxenham, Kertch, says it is hardy and free from mildew, bunch small, berry sweet.

FROSTS.

Fruit was not injured by Spring frosts, except Cherries and Apicots, at Sarnia, on the 13th of May. The first frost at Sarnia and at Corunna was on the 4th of September, but did not injure anything. The first that injured Tomato plants, Dahlias and Balsams at Sarnia, on the bank of the river, occurred between the 23rd and 24th of October, further from the water it was noticed as early as the 10th of October. At Wyoming, the Melon Vine was yet green on the 8th of October. At Kertch the first frost is reported to have occurred on the 7th of October. Near Corunna, Tomato plants were still green on the 14th of October. At Ravenswood the first frost sufficiently severe to kill cucumbers occurred on the 17th of October.

WINTER.

The Peach Trees, Concord Grape, Isabella, Catawba, and Rebecca and Quince Trees are mentioned as having been injured the past winter.

SHELTER.

The common Thorn has been used as a hedge and shelter with good success. The White Pine and Cedar have been planted, also the Spruce. James Watson says that tree planting has not received the attention that its importance demands. Last winter opened the eyes of farmers to this fact. Fall wheat in sheltered situations gave forty bushels to the acre, whereas in exposed situations it was so badly killed as to amount almost to a failure.

BIRDS.

Woodpeckers, Wax-Wing and Robin are mentioned as injuring the fruit, especially eating the cherries.

COUNTY OF LANARK.

CHERRIES.

For a number of years have not been a large crop. Spring frosts injure the blossoms. Even Wild Cherry Trees bear very little fruit.

RASPBERRIES AND BLACKBERRIES.

These have grown abundantly in the woods and around the fields, and the finer varieties have not been cultivated.

PEARS.

Have not been successfully cultivated. The failure is, perhaps, in part at least attributable to carelessness in the selection and cultivation.

APPLES.

The Codlin Moth has been very troublesome for some years about Smith's Falls, and appears to be increasing and spreading over all this section of country.

PLUMS.

The Egg Plum, Blue Plum and Green Gage are cultivated. These are all productive, except when injured by spring frosts. None raised for market. A few trees have been killed by Black Knot. The Curculio has for the last two years somewhat injured the fruit.

FROSTS.

The Plums were injured by the spring frosts, being frozen in the blossom.

SHELTER.

Charles McNab, Smith's Falls, says that his orchard, with the trees which in the fall of

1869 devastated a great portion of this section, was sheltered by a natural forest on the West, North and North-West sides. Since that time several trees have died, so far as I can judge, from the removal of the shelter. He planted a small orchard two years ago, and a double line of trees of the Sugar Maple for shelter on the West and North sides.

COUNTY OF LEEDS.

APPLES.

The Snow, Talman Sweet, St. Lawrence and Seek-no-further are cultivated. The Snow is the most productive and hardy, being well adapted to this locality.

PLUMS.

The Red Magnum Bonum is cultivated, ripening in the beginning of September.

THE EUMELAN GRAPE

Thrives well.

COUNTY OF LENNOX.

CHERRIES.

The Cherry crop has been very deficient this year. The Mayduke and Black Cherry are cultivated. The Black Cherry is the most highly esteemed. The Mayduke is the more subject to be eaten by the birds. There are no varieties the birds do not attack.

PLUMS.

The Blue Plum and Green Gage are grown. The Blue is the most productive and most profitable for market. The Black Knot infests the trees. The following remedy has been tried by William Fry, Millhaven, and found by him to be successful, viz., a salve made of native sulphur, sulphuric acid and lard. This applied, after cutting off the excrescence, by covering the wound with the sulphur salve. The Black Knot would occasionally break out, but one or two applications of the ointment stops it.

WINTER.

The Raspberry Canes and the branches of apple trees have been injured by the cold during the past winter.

SHELTER.

The Maple and Locust are planted in the neighbourhood of Millhaven for shelter.

BIRDS.

Robins and Yellow Birds devour cherries and currants.

COUNTY OF LINCOLN.

CHERRIES.

The crop has been very good. The Kentish, Coe's Transparent, Mayduke, Elton, Black Eagle, Bigarreau, Black Tartarian, and all other sorts thrive well. Those named as being most highly esteemed are Gov. Wood and Coe's Transparent for table, Black Tartarian and Bigarreau for market; Kentish for cooking; for eating Belle de Choisy and Knight's Early Black. John W. Ball, Niagara, mentions a good seedling cherry which he cultivates, and says it is a fine cherry, a good bearer and does not rot. The birds take the sweet and early varieties. The firm-fleshed cherries are the least subject to their attacks.

RASPBERRIES.

The Black Caps, Red and Yellow Antwerp, Davison's Thornless, Mammoth Cluster, Doolittle, Philadelphia, Clarke, Fastolff, Franconia, Brinckle's Orange and many other sorts. The Black Caps, Brinckle's Orange, Fastolff, Franconia and Philadelphia are among the most productive. The most hardy are the Black Caps; next to these stand the Franconia and Philadelphia. The Mammoth Cluster is one of the most productive and largest of the Black Cap family. No insects found troublesome.

BLACKBERRY.

The Early Wilson is sufficiently hardy to thrive well, but has not yet been long enough in cultivation to ascertain its true value.

PEARS.

All varieties thrive well, except that the trees are generally subject to the pear tree blight, which, however, was not very bad the past season. The Glout Morceau seems to be the most subject to blight. The weather has been dry and hot for the two past seasons, and the wood growth has been well ripened.

APPLES.

All the leading varieties are grown, and do well. The Early Harvest, Red Astrachan and Early Joe are most esteemed for summer use; for fall and early winter, the Duchess of Oldenburgh, Gravenstein, Fall Pippin, Melon, Snow Apple and Ribston Pippin; for winter use, the R. I. Greening, Baldwin, Esopus Spitzenburgh, Mother, Swayzie Pomme Grise, Golden Russet and Roxbury Russet. The Codlin Worm is very injurious, and on the whole is increasing in numbers and the extent of its ravages. Very little is done to lessen their numbers, beyond allowing the pigs to run in the orchards. Dr. Cross has been trapping them with cloths wound around the trees for the past two seasons, but does not yet experience any beneficial effects, though he has in this way caught and destroyed large numbers.

PLUMS.

Every variety can be grown; but they thrive best on well drained, clayey soils. The Black Knot has been exceedingly troublesome, and many have lost all their trees from this disease. The Curculio also is very abundant, usually ruining the crop, unless some pains is taken to jar the trees, and capture and kill the insects. Those who have adopted this course have uniformly succeeded in raising good crops of plums.

THE EUMELAN GRAPE.

Is quite hardy and free from mildew. The fruit is of medium size, and generally well liked, though not thought to be equal to the Delaware. M. Y. Keating, Jordan, says that nearly all of the previous season's growth was killed by the frost last winter. The Delaware also suffered more from frost last winter than they have at any time since 1864.

FROSTS.

The fruit was not injured by spring frosts. The first fall frosts, that did any injury at Grimsby, occurred on the 24th of October. Light frosts on the 15th, 16th and 18th September, at Jordan, but not severe enough to injure anything. At Niagara, frost was seen the first week in October, but no injury was done. In Grantham, there had been no frost sufficient to injure anything up to the 17th October. At Smithville, there was frost on the 16th September and on the 26th, but caused no injury.

WINTER.

The Balsam Fir Trees were injured, and many grape vines; even those esteemed very hardy.

SHELTER.

The Norway Spruce, White Pine, White and Yellow Willows and Elm, have been planted to a limited extent.

BIRDS.

The Woodpecker, Turkeys, Robin, Wax-Wing and Blackbirds eat cherries, grapes and apples. M. Y. Keating says, two years ago an immense number of robins collected in my vineyard, and destroyed about 1,500 lbs. of grapes in one day, and even picked up what grapes had dropped on the ground. The grapes that year were full of a kind of maggot in the seed, which I have not seen since. The robins destroyed them, too.

COUNTY OF MIDDLESEX.

CHERRIES.

The crop was hardly an average, though the Kentish were tolerably abundant. The Yellow Spanish, Mayduke, Black Tartarian, Kentish, Governor Wood, Napoleon Bigarreau, Black Eagle, Rockport Bigarreau, Belle de Choisy, Belle Magnifique, Elton, Coe's Transparent, Late Duke, Early Purple, Reine Hortense, Morello and Early Richmond, are cultivated. Those most highly esteemed are the Early Richmond, Mayduke, Late Duke, Elton, Rockport Bigarreau; the first on account of its uniform productiveness and excellent qualities for cooking and preserving; the second and third are of finer quality, but not so uniformly productive, good when fully ripe, either for cooking or dessert; the fourth and fifth as dessert cherries, especially the fourth. The Black Heart is also well spoken of. The early and sweet sorts are most subject to be eaten by birds, but none entirely escape. The Butner's Yellow escapes the best of any, but it is a fruit of poor quality.

RASPBERRIES.

The Philadelphia, Doolittle, Mammoth Cluster, Davison's Thornless, Golden Thornless, Fraconia, Red and Yellow Antwerp, Brinckle's Orange, Clarke, Orange King and Hornet, are cultivated. The Philadelphia and Clarke, *red*, Brinckle's Orange, *white*, and Mammoth Cluster, *black*, are the most productive. The most hardy are the Philadelphia, Clarke, Doolittle and Mammoth Cluster. W. Saunders, London, says the Mammoth Cluster is by far the best of the Black Cap Raspberries; Dr. Landor, London Asylum, says it is little better than wild ones; Wm. Sutherland, that it is better than the uncultivated, only for sending to a distant market; A. Francis, Delaware, says he likes it much, having large fruit, productive and quite hardy; G. G., Hamilton, Ailsa Craig, says it is a numbug.

BLACKBERRY.

The Early Wilson was fruited by Mr. Saunders, who thinks it a very fine berry, but much of the crop was destroyed by a species of fly, which punctured the fruit and fed on its juices. Dr. Francis finds it very large and good, but not hardy.

PEARS.

The Rostiezer, Beurre Bosc, Bartlett, Flemish Beauty, White Doyenne, Grey Winter Doyenne, Louise Bonne, Stevens' Genesee, Dix, Seckel, Swan's Orange, Theodore Van Mons, Beurre Diel, Duchess d'Angouleme, Kingessing, Winter Nelis, Brandywine, Urbaniste, Lawrence, Jargonelle, Beurre Clairgeau, Buffam, Vicar of Winkfield, Tyson, Glout Morceau, Benne d'Anjou, and many other sorts are grown. Not any blight reported during the past season.

APPLES.

All varieties thrive well. The sorts most esteemed are the Red Astrachan, Keswic Codlin, Duchess of Oldenburgh, Porter, Baldwin, Snow, King of Tompkins, Spy, Pomme Grise, R. I. Greening, Golden Russet, Twenty Ounce, Early Harvest, Esopus Spitzenburg, Yellow Bellefleur and Fall Pippin. The Codlin Worm has been troublesome in many orch-

ards, and seems to be on the increase. Nothing is done in the way of destroying either the worms or moths other than gathering up the fallen fruit.

PLUMS.

The following varieties are cultivated, viz.:—

Lombard, Victoria, Smith's Orleans, Green Gage, Imperial Gage, Washington, McLaughlin, Bradshaw, Lawrence's Favourite, Yellow Egg, Huling's Superb, General Hand, Reine Blanche, Coe's Golden Drop, Bingham, Guthrie's Apricot, Pond's Seedling, Yellow Gage, and Duane's Purple.

The most productive are:—

Lombard, Victoria, McLaughlin, Imperial Gage, Washington and Yellow Egg, in the order given, and the following are the most profitable:—Lombard, Victoria, Washington and Yellow Egg, because they are *large* as well as productive.

The Black-Knot has not been very troublesome. The Curculio has not been very abundant the past year, though some complain that they are plenty. Those who have practised jarring the trees regularly secure good crops of fruit.

THE EUMELAN GRAPE.

G. G. Hamilton, Ailsa Craig, says it is the best hardy Grape he has tested; had nearly twenty bunches this season; that it is free from mildew, but did not stand the frost of the last two winters. Dr. Francis, Delaware, reports no mildew, but the vines killed to the ground last winter. A. C. Attwood, Vanneck, has found it hardy thus far. Alexander Gould, London, says it is worthless as a hardy Grape, not being hardy. John B. Taylor, London, says it is quite hardy, a very nice flavoured Grape, likes it next to Delaware, better than Concord, Isabella, or Roger's. Charles Stead, London, had forty bunches on his vine, pinched off ten of the poorest, the berries not large, about the size of the Diana, flavour good, but disappointed in the size of the bunches; ripe the 25th of September, stood the winter well, no mildew this year but some last.

FROSTS.

The fruit was not injured by Spring frost, except that the cherries seemed in a few places to have suffered. Slight frost about the 30th August, at Ailsa Craig, and on the 2nd, 3rd, and 14th September. The first frost to injure vegetables was on the 28th September. At Delaware, the first frost was on the 1st October. At Appin, the first frost occurred on the 3rd and 4th September. Near Glencoe the first severe frost was on the night of the 10th October. At London the first severe frost occurred on the 19th October.

WINTER.

The Diana, Adirondac, Isabella, and Roger's Nos. 15 and 4 Grapes, Orange Raspberry, Moorpark Apricot, Bigarreau Cherry, the blossom buds of the Peach, the Delaware, Salem, Iona, Concord, Hartford Prolific, and Eumelan Grape, and Wilson Blackberry were injured by the winter. The Philadelphia Raspberry slightly injured.

G. G. Hamilton, Ailsa Craig, says:—

"As I was much absent, in the fall, from home, I concluded not to cover up the Grape vines, but give them a fair trial. The result was as follows:—Early in April the wood of the Eumelan seemed fresh, and, to all appearance, alive up to about 1st May, excepting the small extremities. Subsequently the wood blackened, and I had to cut down to within six inches of the ground to get living wood. The growth of the shoots has been most vigorous since, several of them as much as from ten to twelve feet, by last of July. There are from 15 to 20 bunches of fruit, which is double the size of that of last year now. (31 July.)

"The Isabellas, in open ground, were cut down to the ground, no fruit at all. The Isabella against the seven foot, nearly as bad, has two small bunches of fruit, had fruit last year destroyed by early fall frost during my absence. The Concord in the open ground has had a partial injury, having had the fruit buds killed on the higher portion of the wood excepting two or three, but has several fine bunches near the ground. A nursery agent some three miles

west of this tells me that his Hartford Prolife, Isabella, and Clinton are not in the least injured, but the Delaware is; they have no shelter but are on high ground, clay soil. An Isabella some six years planted on the eastern side of and trained to a dwelling, and having a stem of over two inches thick was cracked with the frost to the ground and completely killed above the surface, but came up feebly from the root some time in June. I trimmed some of the leaves of a portion of a Clinton trained against said seven foot fence on beginning of July and a quantity of the fruit mildewed when trimmed.

"The Eumelan ripened later than in 1871, although my other sorts were earlier. This I attribute to the vine having been killed close to the ground, so that all the fruit came from shoots within six inches of the surface. Did not ripen before the 20th September, the fruit was as large as a medium sized Concord.

SHELTER.

White Pine, White Willow, Maple, and Norway Spruce, Arbor Vitæ, and Balsam Fir, are planted by a few, but not much attention has been paid to the planting of trees for shelter.

BIRDS.

Mr. Saunders says:—

"The Robin is the greatest scoundrel, a most unmitigated rascal; eats almost everything that is good, especially strawberries, cherries, grapes, and plums—Waxing hard on cherries." Others complain of the Wax-wing, Catbird, Brown Thrush and Woodpecker.

FRUIT UNDER GLASS.

The following varieties of Grapes are mentioned as being cultivated:—The Black Hamburgh, Chasselas Musque, Duchess of Buccleuch, Golden Chasselas, Golden Champion, Buckland's Sweet Water, Bowood Muscat, Muscat Hamburgh, Royal Muscadine, Grizzly Frontignan, Black St. Peter, Muscat of Alexandria, Champion Hamburgh, Syrian, Victoria Hamburgh, Deacon's Superb, Wilmot's Hamburgh, Rose Chasselas, Lady Downe's, Black Frontignan, and Muscat Otonell.

COUNTY OF NORFOLK.

CHERRIES.

The crop was very poor. The varieties most esteemed are the Black Tartarian, and Elton. The birds take most of the sweet Cherries, but attack all.

RASPBERRIES.

The Philadelphia is grown.

PEARS.

Many trees have been killed by the blight, though it was not prevalent the past season.

APPLES.

Many varieties are grown, so that there are Apples the whole year round. The most esteemed are the Red Astrachan, Sweet Bough, Hawley, Gravenstein, Fall Pippin, Swaar, Tompkin's County King, Spy, and Golden Russet. The Codlin Worm has not been any more injurious the past season than usual. No pains are taken to destroy it.

PLUMS.

The Common Plum is the only variety named. There has been some Black Knot the past summer; the only remedy resorted to is cutting it off. The Curculio is reported not to be very abundant; nothing done to kill them.

FROSTS.

Fruit crop not injured by Spring frosts.

COUNTY OF NORTHUMBERLAND.

CHERRIES

Have been an average crop. The Common Black English is cultivated and esteemed on account of its hardiness and productiveness.

RASPBERRIES.

The Yellow Autwerp, Brinckle's Orange, and Doolittle's Black Cap are grown; the two latter are the most productive, the Black Cap the most hardy, but a covering of snow is quite sufficient for any. J. W. Johnston, Campbellford, has fruited the Mammoth Cluster and thinks highly of it; a strong grower and productive.

PEARS.

The Bartlett, Flemish Beauty, Jargonelle, Louise Bonne. and Vicar of Winkfield, are named. No blight.

APPLES.

Red Astrachan, Early Harvest, Sweet Bough, and another early variety got for Red Canada, which I think is probably Benoni, but cannot be sure. Primate, Keswick Codlin, Duchess of Oldenburg, St. Lawrence, Alexander, Pomme Royal, Gravenstein, Fameuse, Ribston Pippin, Hawthornden, Lowell, Baldwin, Bellefleur, King, King of Tompkin's Co., Melon, Northern Spy, Pecks Pleasant, Pomme Grise, Rambo, Rome Beauty, Canada Reinette, Rhode Island Greening, Golden Russett, Roxbury Russett, Swaar, Tallman Sweetin, Twenty Ounce, and others are grown. Those most esteemed are Red Astrachan, hardy, bears well, fruit large and fair, and sells readily; Primate, hardy, good bearer, excellent quality; Duchess of Oldenburg, St. Lawrence and Alexander, hardy, good bearers, and good market fruit; Fameuse, hardy, good bearer and good fruit, but is sometimes spotted; King of Tompkin's Co., Northern Spy, Rhode Island Greening, and Twenty Ounce, because they are good for market; and Golden Russet, Rome Beauty, and Talman Sweet.

The Codlin is reported not prevalent.

PLUMS.

The Lombard, Yellow Egg, Washington, and Bleeker's Gage, are grown. The three first are the most productive; no Black Knot. The Curculio has been abundant this year, and they capture a good many under chips and boards placed under the trees for them to hide under.

THE EUMELAN GRAPE.

J. W. Johnston, Campbellford, has fruited it; quality good, but grapes small and bunch loose; it was protected during the winter; not subject to mildew.

FROSTS.

The fruit was not materially injured by Spring frosts. *The first severe frost was on the 17th October, at Campbellford; at Burnbrae the first frost that did any damage was on the 12th of October.

WINTER.

The Adirondac Vines were injured at Campbellford where the snow did not cover them, also the Delaware, Creveling, Rogers' 15 and Iona. At Burnbrae, the Gravenstein, King of Tompkins County, Spy, Rhode Island Greening, and Swaar, suffered partially in the branches.

SHELTER.

Arbor Vitæ is planted by a few.

BIRDS.

The Woodpecker, Blue Jay, and Robin, commit depredations on the fruits.

COUNTY OF ONTARIO.

CHERRIES.

At Oshawa, Whitby, and Brooklin, there was a good crop; at Beaverton and Whitevale, none. John White and John McGill, Oshawa, report no crop. The Kentish or Common Red, Elton, Black Tartarian, Black Eagle, Mayduke, Yellow Spanish, Governor Wood, and Elkhorn are grown. The Elton is much esteemed for its flavour, productiveness and hardiness. The Kentish is also much valued on account of its hardihood and cooking qualities. The birds attack all varieties.

RASPBERRIES.

The Franconia, Philadelphia, Brinckle's Orange, Red Antwerp, Doolittle Black Cap, Davison's Thornless and Mammoth Cluster, are grown. The most productive are the Philadelphia and Davison's Thornless. The most hardy are the Philadelphia and the Black Caps. John McGill likes the Mammoth Cluster very much, and finds it hardy. Isaac French, Oshawa, has fruited it, and finds it hardy, but prefers Davison's Thornless.

BLACKBERRY.

Mr. French has fruited the Early Wilson, and says it is a fine large berry, but plant not hardy. John White says it was cut down to the ground by frost, prefers the fruit to that of the Kittatinny.

PEARS.

The Flemish Beauty, White Doyenne, Duchess d'Angouleme, Osband's Summer, Bartlett, Beurre Clarigeau, Beurre d'Anjou, Tyson, Louise Bonne, Howell, Sheldon and Brandywine are grown. The blight is troublesome here also, though not as bad as in many other counties.

APPLES.

The Baldwin, Spy, King of Tompkins, Snow, Yellow Bellefleur, Maiden's Blush, Colvert, Fall Pippin, Red Astrachan, Sweet Bough, Early Harvest, Talman Sweet, Rambo, Golden Russet, R. I. Greening, Sour Bough, Early Red Streak, Early Joe, Alexander, Fall Janeting, Holland Pippin, Woodstock Pippin, Golden Greening, Red Romanite, Esopus Spitzenburg, Spy, Seek-no-further, Swaar, and many others. Those most highly esteemed are R. I. Greening, Early Harvest, Spitzenburg, Spy, Duchess of Oldenburgh, Red Astrachan and Fall Pippin. The Codlin worm is becoming very injurious, and nothing is done to destroy the insect.

PLUMS.

The Green Gage, Lombard, Monroe Gage, Washington, Bleeker's Gage, German Prune, Yellow Gage, Yellow Egg and Bradshaw, are cultivated. The most productive are the Lombard and Washington. There seems to be but very little Black Knot, the only remedy is amputation. The Curculio is not very troublesome, and only one person says he jars the trees and catches them.

FROSTS.

The fruit crop was injured by frosts late in April, and by bleak east winds. The first severe frost at Oshawa was on the 17th October, but did no injury to fruit. At Beaverton, the first frost was on the 3rd of October, no damage; on the 20th October it froze hard.

WINTER.

Wilson's Early and Kittatinny Blackberry were killed to the ground. Strawberry plants badly killed ; the Clinton Grape Vine partially killed back at Whitby.

SHELTER.

Not much has yet been done in the way of shelter ; a few Maple, White Willow and White Spruce have been planted.

BIRDS.

The Robins, Wax-Wing and Woodpeckers are mentioned as injurious.

COUNTY OF OXFORD.

CHERRIES.

The crop was good. The Kentish, Blackheart, Mayduke, and Elton are grown ; the Mayduke is esteemed for its flavour, earliness and productiveness. The birds attack all sorts.

RASPBERRIES.

The Mammoth Cluster, Davison's Thornless, Philadelphia, and Clarke, are grown. All these seem to be hardy. J. G. Mitchell, Nissouri, esteems the Mammoth Cluster very highly and finds it quite hardy. No insects on the plants.

PEARS.

The Dutchess d'Angouleme, Louise Bonne, Tyson, Belle Lucrative, White Doyenne, Sheldon and Bartlett are grown. No blight this season.

APPLES.

The following varieties are grown :

Early Harvest.
Early Strawberry.
Red Astrachan.
Sweet Bough.
Fall Orange.
Fall Pippin.
Fall Janeting.
Alexander.
Snow Apple.
Hawthornden.
Colvert.
Golden Sweet.
Maiden's Bush.
Kewick Codlin.
Gravenstein.

Seek-no-further.
Ribston Pippin.
Monmouth Pippin.
Wine Sap.
King of Tompkins Co.
Baldwin.
Winter Greening.
Winter Swaar.
Yellow Bellefleur.
Talman Sweet.
Spitzenburgh.
Roxbury Russet.
Northern Spy, Golden Pippin.
Gilly flower, Romanite.
Twenty Ounce.

The Codlin Moth has not been as bad as last season.

PLUMS.

The Duane's Purple, Lombard, Washington, Yellow Gage, Orange. Yellow Egg, and Green Gage are cultivated. The Lombard is the most productive and profitable for market. The Black Knot has not been very troublesome. The Curculio has arrived ; no report of any attempts to catch it by jarring the trees or otherwise.

FROSTS.

Fruit not injured by Spring frosts.

WINTER.

No trees or vines reported injured by the cold during the past winter.

SHELTER.

The Lombardy Poplar and Balsam Fir have been planted to a limited extent for shelter.

BIRDS.

The Wax-Wing and Robin are destructive to fruit.

COUNTY OF PEEL.

CHERRIES.

The crop at Credit was a poor one, at Halton, good. The Yellow Spanish, Napoleon Bigarreau, Kentish, and Black Heart are grown. The Napoleon Bigarreau is esteemed for its productiveness, the Kentish for its hardihood. The birds eat all sorts.

RASPBERRIES.

The Franconia, Fastloff, Red and Yellow Antwerp, Brinckle's Orange, Hornet, Doo little's Black Cap, and Mammoth Cluster are grown. The most productive are the Red and Yellow Antwerp. The Black Caps are the most hardy.

BLACKBERRIES.

The Early Wilson has proved thus far to be tolerably hardy, more so than the New Rochelle or Lawton.

PEARS.

The Bartlett, Flemish Beauty, Louise Bonne, Madeline, Vicar of Winkfield, Sheldon, White Doyenne, Bell Pear, and Belle Lucrative are grown. No blight.

APPLES.

The Baldwin, Borassa, Spy, R. I. Greening, King of Tompkins, Wine Sap, Rambo, Ribston Pippin, Holland Pippin, Colvert, Snow, Red Astrachan, Early Harvest, Golden Russet, Red Canada, Fall Pippin, Maiden's Blush, and others are grown. Those most highly esteemed are the Early Harvest, Baldwin, R. I. Greening, Spy, Golden Russet, Snow, and Fall Pippin. The Codlin Worm has on the whole been less injurious than usual. No efforts made to kill them.

PLUMS.

Coe's Golden Drop, Yellow Gage, Yellow Egg, Red Magnum Bonum, Green Gage, Purple Gage, Imperial Gage, and Blue Plum are grown. The most productive are the Yellow and Purple Gages, and the Blue Plum, and likewise most profitable for market. The Black Knot is most severe in the Blue Plum; the only remedy tried has been excision. The Curculio has not been as bad as usual. Fine crops are had, whenever jarring the trees, and destroying the Curculio has been energetically tried.

THE EUMELAN GRAPP.

Judge Scott, Brampton, thinks the vine only tolerably hardy, free from mildew, has not fruited. O. Hammond, Credit, thinks the fruit very good; the plant hardy and free from mildew.

FROSTS.

The fruit was not injured by spring frosts at Brampton; at the Credit the grape crop was injured; at Halton, there was a heavy frost on the 25th of May, which did some damage, and at Richview the apple crop suffered severely. The first fall frost injuring tomato and potato vines occurred in October.

WINTER.

Judge Scott says:—Fruit trees not injured unless the fruit-buds may have been affected.

Grape vines planted in Spring of 1871, and left entirely unprotected were all, except one, killed to the ground. The exception was a Creveling (one of two). The other Creveling was killed altogether, and 2 Concords,—2 Roger's 19,—1 Adirondac,—1 Roger's 15,—1 Hartford Prolific,—1 Brant,—1 Israella and 1 Eumelan, all grew up pretty well from the root, the Israella being by far the strongest and best vine. One Delaware grew up, the other was killed outright, and one Cornucopia was killed outright and the other is barely living. Among all these it is difficult to say which is best but the Cornucopia appears in this one instance, to be the least hardy of the lot.

O. Hammond says: Yes, the out-door grapes were many killed and others injured. Delaware, Concord and Rebecca killed; Diana and Hartford injured; Sweet Bough Apple injured, No other injuries reported.

SHELTER.

Judge Scott says:

1. There is but little tree planting for shelter here. So far as my observation extends, the White Pine appears to require the least trouble and give the best results of any of the evergreens.

Mr. Thomas Ramage, Richview, remarks that tree planting for shelter is practised by myself: I planted a single row of White Pine 8 years ago, the plants were from 4 to 5 feet high, they are now from 12 to 16 feet high.—I planted them 3 feet apart. They would do very well 5 or 6 feet apart. Last spring I planted 100 pines, notwithstanding the dry summer, I only lost about 15 per cent of them; they do best in grass. The grass serves as a mulch. I plant as follows: Pare the grass off the surface where the tree is going to be planted, then dig the hole sufficient to receive the roots beat the bottom of the bed into a perfect tilth 4 in. or 5 in. deep; pack the roots carefully with fine mould, then mulch over with the grass pared off: in all cases have a portion of the original soil removed with the tree—plant in the Spring, when the young wood has shot out about half an inch; not before. I do not find it much more difficult to grow pine than any other tree. It is beginning to be practised in the neighbourhood.

BIRDS.

The Wax Wing, Robin, Crow, and Woodpecker, are reported as injurious to the Fruit Grower. Judge Scott says:—"We have so many sportsmen (?) here, that there are not many birds left to give trouble." He also adds that he would like to see the culture of the pear much more general than it is here; good early varieties being, I think, the most desirable. A possible peach would be a great boon, and the best market small fruits would be an advantage.

COUNTY OF PERTH.

CHERRIES.

The crop has been good. The Black Eagle, Yellow Spanish, Kentish, Belle Magnifique, Early Richmond, Carnation, Mayduke, Reine Hortense, and Black Heart are grown; the Black Eagle on account of its flavour, the Mayduke for size and flavour, Kentish and Belle Magnifique for cooking and yield. The birds attack all, especially the sweet and early sorts.

RASPBERRIES.

The Knevet's Giant, Philadelphia, and Clarke, are grown. The Clarke is reported the most productive. The Philadelphia the most hardy, the Clarke nearly as hardy, but the Knevet's Giant somewhat tender. The Mammoth Cluster has been fruited by S. H.

Mitchell, St Marys, two seasons. He finds it perfectly hardy and an enormous bearer; it stands drouth and heat the best of any he has tried, altogether the most satisfactory of any. He says Davison's Thornless is also very productive and about a week earlier, but the fruit and clusters are smaller. No insects observed.

PEARS.

The Beurre Koenig, Doyenne du Comice, Prevost, Pratt, Belle de Noel, Lawrence, Beurre Millet, Forelle, Bartlett, Glout Moreau, Easter Beurre, Beurre Diel, Duchesse d'Angouleme, White Doyenne, Louise Bonne, Osband's Summer, Seckel, Rostiezer, Flemish Beauty, Belle Lucrative, Vicar of Winkfield, Kingessing, Graslin, Pound, Verzouzier, Delices de Hardenpont of Angers, Doyenne d'Ete, l'œurre Giffard, Supreme de Quimper, Ananas d'Ete, l'œurre d'Anjou, Beurre Langelier, Leon le Clerc of Laval, Onondaga, l'œurre Clairgeau, Eliot's Early, Bloodgood, Euffam, Howell, Madeline, McVean, l'œurre Superfine, Bezi de Montigny, l'œurre d'Amanlis, Sheldon, Nouveau Poiteau, and Brandywine, are grown. There has not been much blight this season.

APPLES.

The Duchess of Oldenburg, Ribston Pippin, Red Astrachan, E. Harvest, Golden Sweet, Sweet Bough, Colvert, Spice Sweet, Snow, 20 oz. Pippin, Gravenstein, Fall Pippin, Monmouth Pippin, Baldwin, Rhode Island Greening, Wine Sap, Talman Sweet, King of Tompkins County, Golden Russet, Seek-no-farther, and many other sorts are grown.

S. H. Mitchell says he prefers the Astrachan the best early, for hardiness, beauty, productiveness, and healthiness, as it has no equal and it will bring a higher price in market than any other early kind.

The Gravenstein, Snow Apple, Fall Pippin, R. I. Greening, Rox Russet, and N. Spy, for size, cooking, and keeping qualities, are mentioned by others.

John Dutton, Stratford, says he prefers the Red Astrachan—thrifty grower, free bearer, and fine fruit; Fameuse—hardy, good bearer, fine fruit; Hawthornden—immense bearer, and splendid cooking apple; Garden Royal—good, though not productive, good fruit; Hawkins Pippin I value as much as any I have grown, strong, stocky, upright grower, early and great bearer, annually covered with immense fruit, very solid, weighing from 10 to 16 oz. each; St. Lawrence—good in all points, fine fruit; Maiden's Blush—good bearer; Jonathan—a beautiful apple, very productive.

The Codlin Worm has been very injurious the past season. Nothing has been done to destroy the moths or worms other than gathering up the fallen fruit.

PLUMS.

John Dutton, Stratford, says:—(We are here essentially in the plum section of the country, they do splendidly, and I make a speciality of them.)

Bingham, English Magnum Bonum, Reine Claude de Bavay, Smith's Orleans, Imperial Gage, Green Gage, Bradshaw, McLaughlin, Lombard, Victoria, Washington, Lawrence's Favourite, Guthrie's Apricot, General Hand, Pond's Seedling, Mediterranean, Jefferson, Monroe Gage, Oullin's Green Gage, Brandy Gage, Denniston's Superb, Golden Esperin, Le Montfort Transparent, Orange, Prince Englebert, Columbia, Beatty's Green Gage, Guthrie's Late Green, Angelina Burdett, Surpasse Orleans, Belgian Purple, Early Purple, Bryanstone Gage, Lucombe's Nonsuch, and Duane's Purple, besides some fine seedlings, are grown.

Bingham and Reine Claude de Bavay do not ripen generally before they are hurt with the frost, but are good for cooking and preserving.

Lombard, Bingham, Reine Claude de Bavay, Magnum Bonum, but in fact all trees bear too heavily; McLaughlin generally sets its fruit nicely separated, consequently always fine.

If for market in the immediate neighbourhood, the largest varieties find the best and quickest sale, as Washington, Magnum Bonum, Bradshaw, &c., but for a distance Lombard, Smith's Orleans, &c.

Have never seen but one small branch affected with Black Knot, which I immediately cut out; the tree (a McLaughlin) was in poor soil, and a settlement of water from the overflow

of a drain close to it. I manured the tree, and this year it is full of fruit. I am of the opinion that a wet, undrained soil, gives a tendency to Black Knot. Have examined two places in this locality, the one where the trees were all crowded together, not more than six feet apart, in a piece of wet soil—every tree was covered with Black Knot; in the other the trees were planted in a low, wet lot, which had open drains about a foot deep, which, when I saw were running, with water, which proved the soil must have been saturated with moisture; and all the trees were badly affected.

Last year I observed a number of plums falling off a Reine Claude. Upon examination observed a crescent-shaped puncture in each; the next morning spread a sheet and jarred the tree, found three curculio. Not a plum dropped from the tree afterwards. I never saw any before or since; they do not appear to be known here.

FROSTS.

No injury this year to the fruit crop from spring frosts. Mr. Dutton says the first fall frost was on the 20th of August, but without injury to fruit. Mr. Colley, St. Marys, mentions the 7th September as the date of the first fall frost. No injury.

WINTER.

Mr. Colley lost his Isabella vines; Concord and Clinton do well with him. Mr. Mitchell says the Rogers No. 19, was the most injured; Clinton and Hartford somewhat.

SHELTER.

Mr. Mitchell has planted a hedge of Lombardy Poplars, and finds them of great benefit. Mr. Bradley says:—"We plant the Scotch fir, larch, English Ash, Basswood, Soft Maple, Black Italian poplar, and sundry others, but few or none are planted by the neighbours.

BIRDS.

The Woodpecker, Wax Wing, and Robin, eat cherries and small fruits.

FRUIT UNDER GLASS.

Mr. Dutton and Mr. Mitchell say they have cold vineries in which they grow the Black Hamburg, Muscat of Alexandria, White Syrian, Chasselas, and Sweet Water.

GOOSEBERRIES

John Dutton says:—

I wish to remark in reference to Gooseberries that I grow the English varieties without difficulty. *I have never had a case of mildew yet.* They bear well, and in the green state being twice as large as the American Seedlings, and easily picked: are much preferred in my family for domestic use. Again, the "imported Gooseberry saw-fly larva" (*Nematus Ventricosus*) is much easier kept down on them. I am so well satisfied with the past five years' experience, that I have thrown out all my Houghton seedlings, &c. This season I have had more than I required for my own use. My culture is as follows:—

Soil good, but rather stiff clay loam, well enriched with stable manure, and a top dressing of lime.

Cultivation.—I train my bushes on a single stem, planted in the open ground, the bushes well separated from each other, so as to secure a free ventilation of air. I believe this to be the secret of success. I have observed (in this town) even the American seedlings badly mildewed; they were planted close together, and under the shelter of apple trees.

Varieties.—On this head I can give no precise information. My trees (two sorts) were purchased from Messrs. J. Bruce and Co., of Hamilton, some years since; a large red sort and a smaller green, samples of which I forwarded to D. W. Beadle, Esq., your esteemed secretary.

J. R. Jarvis, Esq., of this town, has successfully grown them for some years past, and had a large supply this season. He obtained his bushes from England; names unknown. J. Hamilton, Esq., has grown some very large fruit on young bushes planted last fall, I believe.

COUNTY OF PETERBORO'.

CHERRIES.

The Elton, Black Tartarian, Early Richmond and Elkhorn are cultivated.

RASPBERRIES.

The Yellow Antwerp, Franconia and Brinckle's Orange are cultivated, the latter is the most productive, and all are equally hardy.

PEARS.

The Beurre d'Anjou, Bartlett, Doyenne d'Ete, Flemish Beauty, Steven's Genesee, Sheldon, Howell, Osband's Summer and Washington are grown. There has been some blight the past season; the Osband's Summer, Washington and Stevens' Genesee have suffered most.

APPLES.

The Red Astrachan, Early Harvest, Colvert, Fall Pippin, Hawthornden, St. Lawrence, Snow, Northern Spy, Red Canada, Ribston Pippin, Canada Russet and King of Tompkins County are grown. Those most esteemed are the Red Astrachan for summer, the R. I. Greening, Canada Russet and Snow Apple for Winter. The Codlin Moth has been worse than usual. No means are used for destroying the insects.

PLUMS.

Those cultivated are the Coes' Golden Drop, Duane's Purple, Imperial Gage, Jefferson, Yellow Egg, Peach Plum and Washington. Coe's Golden Drop, Yellow Egg and Duane's Purple are the most productive. Never saw Black Knot in North Douro.

FROSTS.

Plums, Cherries and Apples were injured by a late spring frost in the end of April. The first fall frosts happened on the 14th and 15th of September.

WINTER.

The Russet Apple, Sparhawk's Honey Cherry, Washington and Peach Plum and Sheldon Pear were injured.

SHELTER.

The Arbor-Vitæ is planted for shelter.

BIRDS.

The Wax-Wing eats cherries.

FRUIT UNDER GLASS.

In North Douro; the Black Hamburgh Grape, Taylor's Early Peach, Downton Nectarine and Turkey Fig are grown under glass.

COUNTY OF RENFREW.

CHERRIES.

Andrew Russell, Arnprior, has tried a variety of sorts. They become good plants for two or three years. Don't blossom. Fail. Has persisted with the Mayduke for twenty years and still persists. Has a specimen of it now in apparent health, and this season shoots two and three feet long.

RASPBERRIES.

Has little experience with this fruit. Had the White Antwerp for some years. It fruited pretty well, with laying down in the fall. One of his neighbours had several sorts. One sort a good red berry, which seems to be hardy without protection in winter. The others have perished. The plant I had in '71 fruited this season; the berries not very well developed, probably from too much wood. Covered in winter.

BLACKBERRIES

Have no experience. The plant I had in '71 fruited this season. The berries small. Sweet. Received no pruning. Too much crowded with wood. Covered in winter.

PEARS.

Mr. Russell says with care we might fruit them. Not otherwise. Have the Flemish Beauty on the Quince. Five or six years' growth, with shoots this season two and three feet. My experience would say this must fail without protection. The Seckel I had in '71 and protected in winter. Is now healthy, with this season shoots 6 to 12 inches. Their failure arises, I think, from winter killing.

APPLES.

Have here the Shorepippin (or Alexander), the Fameuse, St. Lawrence—bearing—and the Transcendant and Red Siberian Crabs. Bore sparsely this season. Could the Cedar Bird have anything to do with this? Flocks of them seemed to live upon the blossom while it was in flower. The Codling Worm prevails unprecedentedly. A Transcendent Crab, loaded with many bushels, had not one single fruit free from it. My attention was never called to it before, and as unprecedentedly there was not an aphid to be seen on the trees this season.

PLUMS.

Have had many varieties with poor success. Have now the Lombard, McLauchlan and others, with shoots two and three feet this season. The plants are now at least six years planted. Have had a few blossoms, but no fruit. In former years I have had the Reine Claude, Imperial and Blue, bearing a few fruit. The Curculio has been rather more sparing than usual this season of its ravages on our wild plums.

GRAPES.

I have never had any Grape so delicate with me as the Eumelan which I had in 1870, but I am disposed to ascribe this more to my nursing than to the nature of the plant. I hope to make a good plant of it yet. The Delaware and Hartford with very little protection come out best in spring.

STRAWBERRIES.

The Wilson with me fruited largely. No vermin. My neighbours had good crops this season.

FROSTS.

Little injury was done by the spring frosts. This fall, for the first time, the thermometer fell to about the freezing point, at six a.m., for two or three mornings, with fogs about sunrise. On the 11th October it fell two or three degrees below the freezing point at 6 a.m. The potatoes, tomatoes, grape leaves were untouched till that morning. Saw the first ice on 17th October.

WINTER.

The bygone winter was lenient on trees and plants so far as I noted.

SHELTER.

Our people are becoming alive to this desideratum.

BIRDS.

The Cedar Birds came in unusual flocks this season. They live on all sorts of fruits, mostly wild, however, as I proved one season by putting a nest in a cage, where the sire and dam fed their brood for about a month. On sowing the debris of the cage I had all sorts of fruits, mostly wild.

PADDLE OUR OWN CANOE.

The nursery-men have recklessly supplied us with sorts unsuited to our climate. We ourselves must try and discover what suits us.

COUNTY OF SIMCOE.

CHERRIES.

The crop was not good. The Common Red is the only variety mentioned.

RASPBERRIES.

The White Antwerp, Brinckle's Orange and Mammoth Cluster are grown: the latter is very productive and stands the winter well.

PEARS.

The Beurre d'Anjou and Duchess of Bordeaux are the only varieties named. Very little attention is given to this fruit.

APPLES.

The Red Astrachan, Early Strawberry, Early Harvest, Holland Pippin, Snow, Keswick Codlin, Maiden's Blush, Gloria Mundi, Michael Henry Pippin, Blue Pearmain, Pomme Grise, Peck's Pleasant, Rd. Island Greening, and two or three kinds of Russets and some others are grown. The Red Astrachan, Early Harvest, Duchess of Oldenburgh, Colvert, St. Lawrence, R. I. Greening, Talman Sweet, Golden Russet are highly esteemed on account of their hardihood and productiveness. The Codlin Moth was most injurious to the Golden Crab.

PLUMS.

The Lombard and Blue Plum are the only sorts named: the Lombard is very productive. The Black Knot is not very troublesome. The Curculio was not troublesome.

GRAPES.

The Eumelan is growing. The Delaware, Concord and Roger's No 15 (Agawam) ripened well this season at Midhurst, Township of Vespra.

FROSTS.

Geo. Cowan, Craig Vale, says the frost nearly destroyed all the fruit crop in young orchards in this part. Apples and plums, when the trees were in full bloom on the 1st, 2nd, 3rd and 4th of June. He threw water on some of his trees before the sun rose, but it did not save the fruit. On the 12th October there was frost enough to form ice and crust the ground. At Midhurst a frost occurred on the night of the 1st of September, which killed melon and cucumber vines, but did no injury to fruit. At Shanty Bay there was frost on the 24th Oct., but without doing any injury.

WINTER.

At Craig Vale several apple trees were killed, both grafted and seedling. Not an orchard in this section but lost trees, apples, plums and pears, some partly destroyed, but the largest amount killed outright. Time and cause I believe to be the hot days when the snow was going away and the cold hard weather afterwards. At Midhurst and Shanty Bay there was no injury done.

SHELTER.

The Spruce, Balsam and Maple are planted for shelter.

BIRDS.

We cannot complain of any injury done to our fruit by birds. We lose a few cherries and a few grapes, but they are welcome to them in return for the good we otherwise receive from them.

SMALL FRUITS.

Mr. O'Brien, Shanty Bay, says of the smaller fruits the Gooseberry is the only failure. Our Currants are often splendid; Raspberries the same. The Grape is succeeding much better than was anticipated, and its culture is much on the increase. I doubt, however, that we have yet the right culture. Many small circumstances lead me to the belief that the true culture here, as in many countries where the grape is indigenous, is neither by means of the trellis or arbour, but from a low bush, letting the Vine spread on the ground, and I should prefer letting it run on the grass rather than on open soil. The accompanying diagram will show the plan I am adopting; and which I should like very much to see tried by some one more skilled than I am. One circumstance among others inducing me to try this plan is the following. In the garden of the Rev. Mr. Hablen, at Penetanguishine, a Clinton Vine was allowed to run wild over the grass on the ground. The effect was very remarkable. The Vine not only bore profusely and ripened its fruit as early as the others of the same kind, but the grapes were much finer, both in size and flavour—so much so as to make like a different fruit.

COUNTY OF VICTORIA.

CHERRIES.

There are very few grown—mostly the common Red and a few of the Hearts.

RASPBERRIES.

The Franconia, Brinckle's Orange, Philadelphia and Mammoth Cluster are grown. The three first named are nearly equal in productiveness; the fourth only recently introduced. The Mammoth Cluster proved the hardiest of all the past severe winter. The Mammoth Cluster has been fruited and much esteemed, and thought to be the best Black Raspberry and perfectly hardy.

BLACKBERRY.

The Early Wilson killed back last winter, and was fruited this season for the first time. Some say it was not hurt by the winter.

PEARS.

The Flemish Beauty is mentioned as one of the most promising. Thos. Peall, Lindsay is growing thirty varieties, all dwarfs; but they all look sickly and he is afraid they will not answer well.

APPLES.

The Snow Apple, Talman Sweet, Keswick Codlin, Lady Apple, Hawthornden, Red Astrachan, Pomme Grise, Duchess of Oldenburgh, Fall Pippin, King of Tompkins County, and St. Lawrence are cultivated. The Snow Apple and St. Lawrence are most highly esteemed, proving healthy and hardy. The Codlin Worm is very injurious and seems to be getting worse every year.

PLUMS.

A number of varieties are grown, but no names given. One respondent says he has ten. The Imperial Gage, Lombard, Lawrence's Favourite and Washington are the most productive, the first named being the most profitable for market. No Black Knot. No Cureulio.

GRAPES.

The Eumelan Grape was perfectly ripe on the 25th Sept., sweet, juicy and fine flavoured. The Vine was covered in winter. The Clinton uncovered was entirely killed down.

FROSTS.

Fruit crop not injured by spring frosts. No injury by fall frosts as late as the 10th October.

WINTER.

Thos. Beall says:—"All Apple trees have suffered, more or less. Golden Russet suffered more than any other; Northern Spy next; then Gravenstein. My Vines were not injured although left on the trellis."

Another reports:—"Many of the Apple and Plum trees were severely injured, some entirely killed and others partially (all varieties of Plum trees suffered), and the only varieties of Apples in my orchard that escaped unharmed were the Snow Apple, St. Lawrence and Taiman's Sweeting. I am inclined to think that the destruction of those trees was not altogether attributable to the severe winter, but that the previous extremely dry summer had its share in producing the lamentable result. The trees made little or no growth in the summer and seemed to have very little vitality when the severe winter set in. All the orchards in this section suffered severely."

SHELTER.

Thos. Beall says:—"I have planted largely for shelter. I use Spruce intermixed with the Canadian Walnut, which I have grown mostly from seed got from Ridgeway and St. Catharines. These Walnut trees are doing exceedingly well. I use Hard Maple trees for the eastern end. There are a great many trees being planted in the town for shade or shelter, mostly Maple."

BIRDS.

The Robin is destructive on the grape crop; the Cherry Bird on all small fruit.

Edwin Cooper, Port Carling, Muskoka, says:—

"This being a comparatively new district, fruit culture has not yet commenced; in fact the majority of the settlers will probably not devote their time to it.

"As regards my experience, I only made the attempt at planting this last spring, but hope to be enabled to give a practical account another year.

"I do not think the majority of fruit trees will bear the severe winters here, but doubt not that the small fruit trees will do well, on account of the protection afforded by the deep snow, it usually being from three to four feet deep here, and the winters steady throughout. The danger I apprehend to be in the very cold winds and sharp frosts, which sometimes succeed the melting of the snow, as I found tender plants this spring as fresh and green as in the summer, but the cold winds, after the departure of the snow, soon destroyed them.

"Fruits sufficiently hardy for our winters will undoubtedly do well, as the summers are generally very hot and vegetation thrifty. Wild fruits, such as the Plum, Cherry, Raspberry, Gooseberry, &c., do well here and were this summer unusually prolific, as were also small fruits cultivated by a few settlers"

COUNTY OF WATERLOO.

CHERRIES.

The crop, in general, was good. The Elton, Knight's Early Black, Black Eagle, Gov. Wood, Yellow Spanish, Mayduke, White Heart, Kentish or Common Red, Reine Hortense, Belle Magnifique, Late Duke and Napoleon Bigarreau are grown. The Late Duke, Napoleon Bigarreau, Yellow Spanish, are esteemed for flavour, the Common Red for productiveness and cooking purposes. The birds eat all, especially the early and best flavoured.

RASPBERRY.

The White and Red Antwerp, Brinckle's Orange, Philadelphia, and Davison's Thornless are grown. The Brinckle's Orange and Philadelphia are very productive. The Philadelphia and Black Cap are the most hardy. The Mammoth Cluster has been fruited; is hardy, better than the Wild Black Cap. No insects noticed on the Raspberries.

EARLY WILSON BLACKBERRY.

The fruit is large and flavour good, and the plants are generally doing well, having thus far endured the winters.

PEARS.

Flemish Beauty, Ananas D'Ete, Belle Luerative, Rostiezer, Elliot's Early, Osborne's Summer, Doyenne D'Ete, Seekel, Louise Bonne, Beurre Diel, Steven's Genesee, Grasin, Glout Moreceau, Supreme De Quimper, Vezouzier, White Doyenne, Gray Doyenne, Beurre Clairegery, Beurre Giffard, Albertine, Swans Orange, Bartlett, Duchesse D'Angouleme, Beurre Bose, and several German and Pennsylvania Pears not in general cultivation, such as Weidman's Early, Wine Pear, &c., also Blood Good, Clapp's Favourite, D'Esaulniers, Manning's Elizabeth, Tyson, Buffam. Napoleon, Washington, Oswego Beurre, and Winter Nelis are grown. There was no blight of any consequence the past season.

APPLES.

The following sorts are grown:—

Baldwin, Cabashea, Cayuga Red Streak, Summer Pippin, Summer Sweet Paradise Summer Bellflower, Yellow Bellflower, Palmer's Sweeting, Early Harvest, Snow Apple (two varieties), Primate, N. Spy, Vandervere, Hawthornden, Fallawater, Holland Pippin, Hawley, Porter, American Summer Pearmain, Rawle's Jeneting, Newtown Pippin, R. I. Greening, Keswick Codlin, Wine Sap, Wagener. Alexander, Red Astrachan, White Astrachan, Tet-fski, Monmouth Pippin, Ribston Pippin, Clyde Beauty, Rome Beauty, Swaar, William's Favourite, Minister, Mother, English Russet, Bourassa, Dominie, Melon, Beauty of Kent, Golden Sweeting, Sweet Bough, Hawkin's Pippin, Jonathan, Peck's, Pleasant, St. Lawrence, Mountain St. Lawrence, King of Tompkins County, Duchess of Oldenburgh (two varieties), Pomme Grise, Pomme Grise D'Or, Rox Russet, Golden Russet of W. N. Y., Dutch Mignonne, Colvert Gravenstein, Gloria Mundi, Pomme Royal, Maiden's Blush, Goyeau, Canada Russet, Blenheim Orange, Cooper's Market, &c.; and several other German and Pennsylvania Apples that are not in general cultivation out of this (Waterloo) county, such as Green Rambo, Gortze, Liesser, Red Ramb, Bamberger, &c.

Those most esteemed are the Red Astrachan, Early Strawberry, Keswick Codlin Duchess of Oldenburgh, Gravenstein, St. Lawrence, Baldwin, Snow Apple, Rambo, Northern Spy, Rox Russet, Golden Russet, Swaar, and Esopus Spitzenburgh. The Codlin Worm has been, on the whole, less injurious this year than usual. Only two report having done any thing to get rid of them; these have tied woollen cloths in the branches, and strips of cloth around the trunk, with good success.

PLUMS.

The following varieties are named by Simon Roy, Berlin, in the order of hardihood, viz:—

Guthrie's Apricot, Pond's Seedling, Bradshaw, Lombard, Quackenboss, English Magnum Bonum, Prince's Yellow Gage, Imperial Gage, Reine Claude de Bavay, Oullin's Golden Gage, Guthrie's Late Green, McLaughlin, Bingham, Huling's Superb, Dennison's Superb, Bleecker's Gage, Columbia, Fulton, Victoria, Smith's Orleans, and Coe's Golden Drop. The most productive are the Lombard, Imperial Gage Washington, Bleecker's Gage, Columbia, English Damson and Green Gage. The most profitable for market are the Imperial Gage, Washington, Bleecker's Gage, Columbia, Red and Yellow Magnum Bonum, Smith's Orleans, and Blue Plum. The Black Knot is evidently not so troublesome here as in many places, though it is known, and affects the Common Blue Plum the most. Mr. Schofield thinks favourably of an application of iron filings and turnings to the soil about the roots as a re-

medy for the Black Knot. Others say they employ "Paddy's remedy for saving his leg—cutting off the limb." The Curculio, on the whole, has not been as bad as in former years, though some say it has been plentiful. Simon Roy says that he has practised jarring the trees "with first rate success—so much so that many of the trees are exhausted by over bearing," and many others bear testimony to the like effect. Sheriff Davidson thinks if this mode were followed out persistently, at the proper time, we would have plenty of Plums.

EUMELAN GRAPE.

Titus Sheard, New Aberdeen, says it is hardy and free from mildew. James Younie, Galt, has fruited it; thinks it a fine early and hardy sort, free from mildew. Thomas Mc Millan, Galt, has ripened it well; flavour good, berries small. James W. Scott, Galt, fruited it in 1871 and 1872; bunches very compact, fruit good, hardy with winter protection, and free from mildew. At Berlin it has not yet fruited; appears to be hardy, and free from mildew.

FROSTS.

The fruit crop was not injured by late Spring Frosts. The first ice formed at Galt on 15th October. The first frost occurred on the 2nd October. At Berlin the first frost, injuring vegetation, occurred on the 18th October, but did no damage to fruits.

WINTER.

A large majority of the reports say no injury was done by the cold of the past winter, but Mr. Geddes, Berlin, says, "Grape Vines unprotected were much injured, nearly all the buds were killed, and most of the plums were very tardy in pushing at first, but afterwards made a rapid growth."

SHELTER.

Mr. Geddes has planted Lombardy Poplar. H. F. J. Jackson, says, "Our spring and fall winds—the former occurring about blossom time, and the latter when the fruit hangs at the fullest—are very severe and continuous. The large varieties of pear suffer of course. Dry weather and high winds caused the pear crop to fall last season. We plant Lombardy Poplar about the fences; Evergreens and Filbert Bushes on the west and north." The Spruce is beginning to be planted in a few places about Galt. Norway Spruce is preferred by Sheriff Davidson.

BIRDS.

Nearly all unite in saying that the Birds are, in their opinion, more useful than injurious.

FRUIT UNDER GLASS.

Sheriff Davidson grows a few Peaches on the back wall of his vinery, and the Royal Muscadine and Black Hamburg Grapes.

VINEYARD OF HARDY GRAPES.

Mr. Gotlieb Bettchen has a small vineyard of five hundred vines, which has come into bearing this year, the fruiting of which is very satisfactory. It is one mile north of New Dundee, Township of Wilmot, Waterloo Co.

COUNTY OF WELLAND.

CHERRIES.

The crop was an average generally, but at Humberstone there was a failure, caused by cold rains and hard freezing at the time of blooming, "the principal cause for all our failure in the fruit line." The Black Tartarian, White Ox Heart, Mayduke, Yellow Spanish, Kentish and others are grown; Mr. Stoner, Humberstone, having forty varieties on his place. "The Yellow Spanish and Kentish are most esteemed," says Dr. Bell, Clifton, "the first named

for the solidity of its flesh and sweetness, and the latter for stewing, because of its acidity." Mr. Stoner says that the Bigarreaus are almost worthless, the fruit rots on the trees, and is much affected by the Curculio. He would only plant, of this class, Yellow Spanish and Gridley or Apple Cherry, the latter an enormous bearer, the fruit with a peculiar apple flavour and not inclined to rot. Of the Hearts, he esteems the Black and White Tartarian, Early Purple Guigne, Downer's Late Red, White French Guigne, and Black Heart. Of the Dukes, he names the Mayduke, Early Richmond, Belle Magnifique, Reine Hortense, and Belle de Choisy. The latter is the most delicate Cherry we have, but a somewhat shy bearer. The birds attack all sorts, more especially the early and tender-fleshed varieties.

RASPBERRIES.

The Philadelphia, Doolittle, Black Cap, Mammoth Cluster, and Red Antwerp are grown. The Philadelphia and Doolittle are the most productive and the most hardy. Z. B. Lewis, Clifton, has fruited the Mammoth Cluster and thinks highly of it. J. Neff thinks it sour.

PEARS.

The White Doyenne, Bartlett, Summer Bonchretien, Jargonelle, Louise Bonne, Vicar of Winkfield, Buffam, Flemish Beauty, and many others are grown. Mr. Stoner says he has forty varieties.

The trees have not suffered much from blight this season. Mr. Stoner says his trees always suffered most in August after a severe drought, followed by refreshing showers, accompanied by thunder and lightning, attended with great heat.

APPLES.

All varieties suited to this climate are grown in this county. Mr. Stoner says he has a hundred sorts. Those giving best satisfaction, taking all things into consideration are—*Summer*, Early Harvest, Keswick Codlin, Red Astrachan, Sweet Bough, Golden Sweet, Early Joe, &c.

Fall—Fall Pippin, Gravenstein, St. Lawrence, Hawley, Rambo, Fameuse, &c.

Winter.—Baldwin, R. I. Greening, Esopus, Spitzenberg, Norton's Melon, Ladie's Sweeting, Northern Spy, Beauty of Kent, American Golden Russet, Roxbury Russet, &c.

The Codlin Worm has been very injurious the past season, and has been allowed to multiply without any efforts being made to diminish their numbers.

PLUMS.

The Washington, Lombard, Reine Claude de Bavay, Green Gage, Duane's Purple, and many others are grown; Mr. Stoner says that he has a German Prune he values more than all the Plums he has. "This German Prune was obtained by my father, about 25 years ago, from a German, who brought with him some sprouts for his own use. It is the greatest bearer we have, and very hardy, the most exempt from the Black Knot and the Curculio of any Plum I know of. Fruit rather large. Dark purple, covered with a thick blue bloom; of a rich vinous flavour. It can be kept a long time. It ripens the 1st of September, and improves in flavour by being allowed to hang on the tree. It should be generally known. I believe it to be the most valuable Plum in Ontario."

The most productive are the Lombard, German Prune, Smith's Orleans, Black Imperial, and Blue Damson.

The German Prune and Blue Damson are the most profitable.

The Black Knot is quite prevalent, but by keeping a sharp look-out, and promptly cutting off the diseased parts and burning them, no severe loss need be suffered from this cause. The Curculio has been quite abundant. Those who have practised jarring the trees have had good success in procuring a crop of Plums.

THE EUMELAN GRAPE.

Dr. Bell has tried it and says it is very small, sweet, of good flavour, and very early, ripening before the Delaware. Valuable on account of its earliness.

FROSTS.

The fruit generally was not injured by spring frosts, but at Humberstone the crop was almost a total failure, caused by cold rains and hard freezing in time of blooming. No fall frost to do any injury until about the 10th October.

WINTER.

Mr. Stoner says Peach trees lost their fruit buds, but no loss of trees. Grape vines all suffered more or less except the Clinton. Isabella, Catawba, and Diana froze to the ground. Concord; some of fruit lost, no harm to wood. Delaware; no fruit lost, some wood. Hartford Prolific; lost no wood, a fair crop of fruit. Allen's Hybrid; froze to the ground. Roger's Hybrid, No. 4; not much harmed. Roger's Hybrid, No. 19; lost some wood and part of the fruit. Roger's Hybrid, No. 15; lost all bearing wood, no fruit. The above named vines remained on the frames all winter.

SHELTER.

Jonas Neff says that "planting for shelter is practised to a very limited extent. The sugar-maple is the favourite tree with us. I have half a mile of Honey Locust set out for outside fence and shelter, and they promise well so far."

Leslie A. Stoner says: "I have a belt of evergreens planted to the north and west of the dwelling-house, planted with native Hemlock, American Red and White Cedar, set alternately, to good advantage. I have Balsam Fir, and Norway Spruce—the latter planted 15 years, is now about 40 feet high. If I should plant for garden or orchard shelter, I would plant Norway Spruce. The principal trees planted are the Sugar Maple."

BIRDS.

Dr. Bell, Clifton, says:—"Cannot give names: some small birds attack Cherries. (The most injurious birds are neighbours' hens.) Young specimens of *Homo Bimana* (var. *vagrant*;) are very injurious. Should they not be *jail birds*?"

Mr. Stoner.—"The only bird we dread, is what we call Sapsucker, that taps and bleeds the tree all the season when the sap flows, generally attacks the most thrifty trees with a smooth bark. They will kill the trees if you don't kill them. There are two other kinds seen very busily during the winter, pecking in the rotten wood and old bark of Apple trees, searching for the Codlin Worm and other insects. Spare them by all means, and thank them too. We cultivate and pet all kinds of birds. They are our friends; they will sing for us, and destroy our enemies—the insects. We have planted many large-growing cherry trees, mostly seedlings, for shelter and the birds. We get a nice share of the cherries. We also have the Clinton Grape growing wild up into trees for the birds. They seldom trouble our grapes in the garden. Why cannot every fruit grower do likewise, that has his broad acres—do something for his valuable friends—the birds?"

COUNTY OF WELLINGTON.

CHERRIES

The crop was very good. The Black Tartarian, Kentish, Elton, Yellow Spanish, Plum Stone Morello, Late Duke, Mayduke, Reine Hortense, Empress Eugenie and Belle Magnifique are grown. The Kentish and Mayduke for cooking; Elton and Black Tartarian for table, are among the most esteemed. The birds attack all, especially the sweet sorts.

RASPBERRIES.

The Philadelphia, Franconia and Col. Wilder are grown. The most productive is the Franconia. All sorts require to be laid down and protected in winter. Geo. Elliott, Guelph, says he has fruited the Mammoth Cluster; that it is poor, much resembling the wild bramble-berries in England. Wm. Cowe, Mount Forest, has fruited it and thinks a good deal of it; says, "It is just the thing; very much admired with us." It is hardy.


BLACKBERRY.

The Early Wilson has been grown but a short time and only by a few. Seems to be hardy thus far.

PEARS.

The Duchess d'Angouleme, Flemish Beauty, Belle Lucrative, White Doyenne, Bergamotte Cadette, Buffam, Beurre d'Anjou, Graslins, Soldat d'Esperance, Seckel, Ananas d'Ete, Jargonelle, Bartlett, Dearborn's Seedling, Vicar of Winkfield, Brandywine, Beurre Clairgeau, Osband's Summer, Grey Doyenne, Clapp's Favourite, Van Mons, Steven's Genessee, Glout Morceau, Tyson, Beurre Diel, Beurre Giffard, Onondaga, Bezi de Montigny and Manning's Elizabeth, are cultivated. There seems to be but little blight.

APPLES.

Nearly all the usual varieties are grown in this County. The Red Astrachan, Duchess of Oldenburgh, Snow Apple, and St. Lawrence are esteemed for their hardihood in the neighbourhood of Guelph; for Winter, the R. I. Greening, Spy, Russets, Swayzie Pomme Grise and Spitzenburgh. The Codlin Worm has been quite abundant. James Anderson, Springfield Farm, near Guelph, says:—"The Codlin Worm has been very injurious this season, but since the Fruit Growers' Meeting, at Guelph, I commenced tying old carpets around the trees, and caught the worm by thousands. I looked at them about once a week and killed at one time as many as sixty on a tree. I think an old piece of carpet tied on with a string better than a straw rope.  I have saved the half of my apples by this means."

PLUMS.

The Common Blue, Bradshaw, Washington, Yellow Egg, Lombard, Smith's Orleans, Huling's Superb, Victoria, Pond's Seedling, Yellow Gage, Reine Claude de Bavay, Orange, Lawrence's Favourite, New Early Orleans, Prince Englebert, Coe's Golden Drop, Imperial Gage, McLaughlin, Jefferson, Green Gage, Magnum Bonum, General Hand, Guthrie's Apri-cot, McMillan's Early, Columbia and Fellemberg are cultivated. The most productive are, Washington, Lombard, Smith's Orleans, Yellow Gage, New Early Orleans, Coe's Golden Drop and Huling's Superb. The most profitable for market are, Lombard (first), Smith's Orleans Yellow Gage, Yellow Egg, Coe's Golden Drop (when it will ripen), Huling's Superb and Bradshaw. Washington too tender to transport.

The Black Knot is not very prevalent; attacks the common blue plums most seriously. The only remedy, remove with the knife and burn every piece as soon as seen. The Curculio has not been sufficiently numerous to thin out the fruit. Mr. Elliott picks up all fallen plums every day or two and pours boiling water over them. This plan, practised for some years, has completely cleaned his garden of curculio.

THE EUMELAN GRAPE.

Mr. Elliott has fruited it; had fifteen bunches, good sweet grape, ripened here 10th September; thinks it promises to be the earliest grape yet.

FROSTS.

John Armstrong, Marden, says:—"We had frost when the trees were in blossom, and the furthest advanced suffered considerably." Alex. Glass, Guelph, says:—"The fruit suffered a little, as we had frost often all the month of May." Others say the fruit escaped injury from spring frosts.

John Armstrong says:—"Had a slight frost early in August, which blackened a chance leaf of the potatoes. On the 3rd of September, a sharp frost destroyed the squash vines, but did not observe any harm to fruit."

Alex. Glass says:—"The first frosts were in the first week of September. On the second of October, there was a pretty hard frost. It froze all the Melons and Squash vines and Potatoes. Wm. Cowe, Mount Forest, says the first frost was on the 3rd of September."

WINTER.

James Anderson had four fine healthy plum trees completely killed. They were Duane's Purple, Lombard, Victoria and Washington. The Imperial Gage and Princes' Yellow Gage alongside escaped.

John Armstrong says: "My grapes all suffered, as I think, from the want of snow, as almost none lay on the pea straw with which I cover them. The Delaware suffered most, and produced no fruit, and made scarcely any growth. The Hartford Prolific, Concord, Clinton and Isabella made much less than their usual growth, but produced some fruit, better ripened than on any previous year since planted.

Charles Scott, Melville Mills, Orangeville, says:—"The following trees were killed last winter: Two Rhode Island Greening, two King of Tompkins County, one Snow, Bradshaw Plum, Louise Bonne de Jersey; and a great many others partly killed."

SHELTER.

Charles Scott, Orangeville, says—"I have planted a Hemlock hedge to the north of the fruit garden. It is growing well; planted two years and is two feet high, sheared twice. Last winter killed it a little at the top."

Charles Scott, Elora, says:—"As regards the garden, I have done so in former years, and this fall have been planting shelter for an orchard, intended to be planted next year. Have planted mostly evergreen trees, Spruce, Hemlock, Balsam and Cedar."

BIRDS.

The Wax Wing and Robin, with some other small birds, eat cherries, grapes and small fruits.

FRUIT UNDER GLASS.

Douglas Sorbey, Guelph, cultivates the Rose Chasselas, Black Hamburg and Buckland's Sweet Water Grapes, along with Peaches and Nectarines.

GOOSEBERRIES.

James Anderson says:—"I read a very interesting article on Gooseberry Culture, by Mr. Mills, of Hamilton, in the Fruit Growers' Report of last year. I have now grown the White Smith and the Houghton Seedling with great success for 5 or 6 years, and no mildew. This year I had several bushels off about 8 or 10 young bushes. I manure with a compost of ashes, salt and muck, mixed with lime and barn-yard manure. Keep them well pruned out in the centre and allow no trees to shade them; soil gravelly loam. I had them (the White Smith) weigh 3 to the ounce this year on an average, and it was a very dry year. I used hellebore to kill the saw-fly, and sprinkled the bushes, when in bloom, with gypsum which, I was told, is good to prevent mildew. By following the above directions I have fruited the above varieties for 6 years, and have not had the appearance of mildew. I mulch the roots well in summer. Hope the above may be useful to those that cannot grow gooseberries."

Springfield Farm, near Guelph.

COUNTY OF WENTWORTH.

CHERRIES.

The crop has been very good the past season. The Governor Wood, Mayduke, Reine Hortense, Yellow Spanish, Black Tartarian, Belle Magnifique, Common Red or Kentish, Elton, Black Heart and Napolcon Bigarreau are grown. The Dukes and Morellos are most esteemed for hardiness, productiveness and culinary purposes. The early and sweet varieties are most subject to be eaten by birds; but W. H. Mills, of Hamilton, says that their depredations are easily prevented by placing a stuffed hawk above the trees.

RASPBERRIES.

Davison's Thornless, Golden Thornless, Miami, Doolittle, Mammoth Cluster, Clarke, Philadelphia, Brinckle's Orange and Franconia are grown. "Of the Black Caps," Mr. Mills says, "the Miami and the Mammoth Cluster, and of the others the Philadelphia, are the most productive. The most hardy are Davison's Thornless, Mammoth Cluster and Philadelphia. Has fruited the Mammoth Cluster and does not esteem it as highly as Davison's Thornless, Miami or Doolittle."

PEARS.

The Louise Bonne, Bartlett, Flemish Beauty, Tyson, Sheldon, Lawrence, Beurre d'Anjou, Duchess d'Angouleme. White and Grey Doyenne, Belle Lucrative and all the usual varieties are grown. Very little blight reported this season.

APPLES.

All the varieties of apples are grown that are usually cultivated.

James Heslop, Dundas, says :—"I esteem the Baldwin for its great productiveness, and reliable keeping qualities. The Spy for its high excellence of flavour as a dessert and cooking apple and for its keeping qualities. The Early Harvest, Gravenstein, Snow, Pomme d'Or for their unsurpassed dessert qualities, and the two first for their good cooking; also the Red Astrachan for its beautiful appearance, good market and fair cooking qualities. The Fall Pippin, Colvert, Fall Janeting, Cayuga Red Streak for their excellent cooking properties, the Fallwater and King of Tompkins for their attractive appearance—the first partaking of the Baldwin qualities and a thick tough skin, a valuable compensation for its ordinary quality of richness; but the Greening surpasses all the rest for its *continued good qualities*, although *not possessing any of them in the highest degree*. It is the apple for the million, viz.,—for its local and export market qualities, as a keeping, cooking, dessert and great productiveness, is unrivalled in my orchard. My experience leads me to the conclusion that those varieties possessing the highest qualities of flavour and richness require the highest cultivation."

The Codlin Worm has been exceedingly injurious. James Heslop says he has not tried any means for destroying the worms, but if this worm be not stopped soon, means will have to be resorted to if it requires a *hemp rope*.

W. H. Mills says :—"I make traps rapidly by taking two strips of old shingle from 3 to 6 inches wide, and place between two strips of old carpet, (which, I have no doubt, could be substituted by other material) of about the same width of the shingles, clamp the whole together by the ordinary wooden clothes-pin. Place these traps along the limbs. The larva or worm crawls between the shingles by hundreds spins its web in the woollen fibre, and forms a cocoon, (and if not disturbed) leaves an imago shell to emerge into that beautiful but destructive small moth, ready again to deposit more eggs in the calyx.

These traps require attention at least once a week during the moth season, by removing the woollen rags and dipping in boiling water or running them through a clothes-wringer, these traps, by care, may be made to last many seasons. In addition, I wrap around each tree a doubled piece of woollen rag, and clamp with clothes-pins. I pick up all fruit as soon as fallen; (but older orchards may have pigs turned in) I even shake the trees for the purpose of getting the damaged fruit. Small glass lanterns are kept burning at night, set in shallow basins, containing coal oil, and it is amazing to see the quantities this lure catches."

PLUMS.

All the usual varieties are cultivated. The most productive are Smith's Orleans, Reine Claude de Baviere, Columbia, Green Gage, Bingham, Washington and Lombard. The black knot is not very troublesome; appears most in the Common Blue; the only remedy is amputation and burning. The Curculio has not been very abundant the past season. Those who have tried jarring the trees find it to be very successful, and the only reliable means of securing a crop of plums.

FROSTS.

No injury from late Spring frosts. James Heslop says the frost on the 2nd September did not injure anything; on the 12th October it partially killed tomatoes, but no injury was

done to fruits; the frost on the 16th of October killed the leaves of the Grape vines, and froze the north side of the ungathered apples so that a thin coat of ice formed on them by reason of a very timely dizzling rain, which fell early in the morning and saved the fruit from the threatened injury.

WINTER.

There was much injury done to Grape vines and trees, usually considered hardy, by the combined action of cold and drought.

SHELTER.

James Heslop has planted Red Cedar, Arbor Vitæ, Hemlock, White Spruce and Canadian Balsam. Others are planting the Norway Spruce and Maples.

BIRDS.

The Robin, Blue Jay, Wax Wing, and Crow are thought by some to be injurious, others think they are not half as bad as pilfering boys.

FRUIT UNDER GLASS.

In many places exotic Grapes and Peaches, Apricots, Nectarines and Figs are grown under glass.

COUNTY OF YORK.

CHERRIES.

The crop was good in most parts, though some speak of it as being very poor. About Markham, only the Common Red produced fruit this year. The Black Eagle, Black Tartarian, Napoleon Bigarreau, and Kentish or Common Red, Mayduke, Elton, and Belle Magnifique, are grown. Each of these finds those who esteem them most highly. The early and sweet varieties are most subject to being eaten by birds.

RASPBERRIES.

*The Red and Yellow Antwerp, Black Caps, Franconia, Fastloff, Philadelphia, and Brinckle's Orange, are grown. The Black Caps are very productive and hardy, and of the Antwerp family the Philadelphia and Franconia are the most hardy and productive. Col. Norris, Wexford, has not succeeded in carrying the Mammoth Cluster through the winter.

PEARS.

The Bartlett, Marie Louise, Louise Bonne, Duchess d'Angouleme, Beurre d'Anjou, Glout Morceau, Vicar of Winkfield, Napoleon, Seckel, Sheldon, Clapp's Favourite, Jaminette, Tyson, Buffum, Beurre Diel, White Doyenne, Flemish Beauty, and Edmonds, are grown. The pear blight has not been very bad the past season.

APPLES.

All the usual varieties of apples are grown. Those most esteemed are the Baldwin, R. I. Greening, Snow Apple, Rox Russet, Golden Russet, Red Astrachan, Early Harvest, Swaar, Duchess of Oldenburgh, Fall Pippin, Lyman's Pumpkin Sweet, St. Lawrence, Spy, Ribston Pippin, Esopus Spitzenburgh, Yellow Bellefleur, Gravenstein, and Pomme Grise. The Codlin worm has been on the whole less injurious than usual, though sufficiently abundant to do much injury. No means reported as having been tried of trapping and destroying these worms.

PLUMS.

The Yellow Egg, Green Gage, Washington, Common Blue, Yellow Gage, Magnum Bonum, Imperial Gage, and Coe's Golden Drop, are grown. The most productive are the Imperial Gage and Yellow Egg, and also most profitable for market. Very little of the

Black Knot of late years, though it has killed nearly all the Blue Plum trees in the county. The only remedy is cutting off the affected part and burning it. The Curculio has not been very abundant the past season. Those who have practised jarring, &c., have found it to be very successful.

THE EUMELAN GRAPE.

Thomas Brownlie, Danforth, says the vine received, 1870, has done very well this season, made a good vigorous growth, was not injured by insects or mildew, cut 14 lbs of grapes from it this season; the fruit was mostly ripe on the 15th September, but a few pounds were allowed to remain on the vine for about a month longer, and they seemed to improve greatly. I had some of them near Christmas, and I think they will be a first class keeping grape.

FROSTS.

No injury reported to fruits by Spring frosts. Colonel Norris, Wexford, says, the first time ice was noticed by him was on the morning of October 17th. D. A. Crosley, of Markham, says that the first frost which injured grapes occurred on the 13th October. W. T. Goldsmith, Toronto, says the first freezing was on the morning of the 20th October; a few white frosts previous, but did no injury. John Gregory, Milnesville, says the first frost occurred on the 3rd of September. Thomas C. Thomson, Yorkville, says the first severe frost was on the 15th October, forming ice to the thickness of a five cent piece. John E. Bull, Werton, says the first frost was on the 3rd of September, but not severe enough to kill potatoes.

WINTER.

Colonel Norris says, "I should think all were. But apple trees seemed to suffer the most; of fourteen young apple trees planted last fall, every one was killed. Large trees, perfectly healthy, and planted three years, were many a long time coming into leaf. When I left home on the 6th of June, six or seven of these, I thought, would scarcely come into leaf, and when I returned on the 28th they were still only in partial leaf. I did not lose one of them, but several limbs were wholly killed." W. T. Goldsmith says, some Delaware and Eumelan vines were killed to the ground. James McKirdy, Toronto, says some varieties of apples suffered badly, among which were the Cabbashea and several of the Codlin varieties (names of which I have not got). The trees mentioned shot out vigorously and blossomed profusely, but in a short time they began to look sickly and half dead, the leaves falling off and withering up. In some cases only half of the tree seemed affected, in others, all the tree. I may as well mention that the same trouble has been experienced all around this neighbourhood last winter. Others report similar injury.

SHELTER.

Some Spruces, Balsams and other evergreens are planted. Thomas C. Thomson says, "they are planted to a very considerable extent, we have a windbreak, principally pines, on the north and east sides of our main orchard. The whole of our property (40 acres, more or less) is surrounded by a belt of pines and spruces and firs. I know two of our neighbours who practise, or rather have practised tree planting for shelter, as they have each a windbreak of pines and firs."

BIRDS.

The Robin, Wax Wing, Crows (carrying off apples), and Woodpeckers devour cherries and small fruits. Colonel Norris says "None, most emphatically. Their benefits far, very far, exceed their injuries."

FRUIT UNDER GLASS.

Exotic vines and other fruits are cultivated largely in this county.

PROVINCE OF NEW BRUNSWICK.

Isaiah Tingley, Harvey, Albert County, says that the following varieties of apples are grown there—viz., R. I. Greening, English Bough, Gravenstein, Alexander, Pumpkin Sweet, English Red Streak, Ribston, and Golden Pippin. Those esteemed most highly are R. I.

Greening, Summer Bough, English Red Streak, and Gravenstein. The Codlin Worm was more than ordinarily injurious this season, and no means have been used for their destruction.

PLUMS.

The Green Gage, Washington, Magnum Bonum, and Imperial Gage are grown. The Imperial Gage is decidedly the most productive. The Plum Curculio is not known.

FROSTS.

Fruit crop uninjured by frost. First frost occurred September 20th in this autumn, and no injury to fruit.

WINTER.

No fruit trees injured by severity of last winter. Winter not very severe.

SHELTER

I find tree planting without shelter *almost* impossible. Use for shelter spruce and fir. The latter much preferable.

BIRDS.

Crows mar the sweet apple in their endeavours to pluck them. Mr. Tingley explains "I have answered questions only so far as our fruit growing is pertinent."

ON THE CULTIVATION OF THE EUROPEAN GRAPE VINE UNDER GLASS.

Read before the Meeting of the Fruit Growers' Association, at the Agricultural Hall, Toronto, October 9, 1872.

BY JOHN GRAY, OF THE BROCKTON NURSERIES.

In attempting to give you my experience in the culture of the European grape vine under glass, I do so with great diffidence, conscious of my inability to give you as clear and comprehensive a view of the subject as it demands. But having an experience of thirty-eight years in this climate, the few hints I will give may be of some value to those who are desirous of information on the subject.

In the first place, I would particularly mention the importance of having the borders in which the vines are to be planted properly prepared. The plan which I adopt in preparing my borders is as follows:—I generally procure a quantity of sods from an old pasture or commons, five or six months before I commence to make up the border. This I pile up in a heap about six feet wide; and to about every ten cartloads of sods I add one cartload of lime-rubbish, one load of thoroughly rotted manure, and about one barrel of unboiled bones. This, if the sods are taken from a good calcareous loam, will make what may be termed a first-rate border for vines.

I wish to draw your attention to the fine specimens of grapes now on exhibition in the hall up stairs, from the vineries of Philip Browne, Esq., Bathurst Street, in this city. You will see that they have taken first prizes in all the classes in which prizes were offered by the T. H. Society for grapes grown under glass. Now, as Mr. Browne's vinery was put up under my instructions, and the vines planted by myself, I think I cannot do better than give you their history. The house is a span roof, forty feet long by twenty feet wide, running north and south. The parapets are about two feet six inches high, and the apex twelve feet six inches. The ventilators are at the top on both sides; there are ventilators over the doors also; but these are not used until the fruit begins to colour, for the reason that air admitted at any place, except at the top of the house, before the ripening season comes on, causes mildew, which is the greatest enemy the grapegrower has to contend with in this climate. The soil was a good dark sandy loam, and required drainage, which was done as follows:—One drain

was made along the centre of the house, three feet deep, and one in front of the borders, on each side, parallel to the house, and fifteen feet from it, thus giving borders fifteen feet on each front, with twenty feet inside. Diagonal drains were sunk ten feet apart from the outer to the inner drains, and the centre drain continued to where there was an outlet for it. The whole surface to the depth of $2\frac{1}{2}$ feet was dug out, and the material as above was put in, only that the sods were fresh from the commons, cut about two inches thick. Of course, it would have been better if the turf could have been laid up to rot some time; but, as there was no time for this, the border had to be finished off at once. The border was, therefore, composed of sods fresh from the common, well rotted manure, the soil taken from the surface in excavating for the border, lime-rubbish, and some coarse bones, sufficient to raise the bed about eighteen inches above the level of the surrounding soil. The vines were planted on the 20th of June, 1866, raised from cuttings of the single eye planted in the month of February previous. At the time of planting, they were about eighteen inches high, and were planted $2\frac{1}{2}$ feet apart. The roots were carefully spread out from the ball of earth in which they were growing, and the points of the young rootlets cut off. This was done to cause them to throw out more lateral roots (as I find by experience that vine roots, when not checked, very soon run through the prepared soil without throwing out lateral roots; when they get into the unprepared soil, they receive a check, the roots run down to the cold subsoil after moisture; disease in the vine soon follows and the vines which promised so well the first few years, turn out to be a failure, except means be taken to get their roots to the surface again).

After the vines were planted and watered, they were shaded for a few days. They received no check. By the middle of August, they had made a growth of about ten feet, when the points of the vine were nipped off, to check the growth, and cause them to ripen off the wood. The inside borders were kept well watered during the growing season, and the young vines occasionally syringed. They were pruned down in November to within one foot of the ground, and covered up with earth for the winter. The following spring they started to grow vigorously. Two shoots only were allowed to grow, the stronger of which was allowed to run to the top of the rafter, which it reached by the beginning of August, when the point of the shoot was nipped off as before. The second shoot was stopped at about two feet from the base. The use of this shoot is to get a new cane from, whenever I find it necessary to cut out the old one, which I always do, after producing two or three crops. I find that, by following this system, I can always have larger bunches, and have my vines in a more healthy and vigorous state of growth than I could have by continuing the spurring-in system on the old cane. At the second pruning, in Nov. 1867, I found the canes thoroughly ripened. I cut them back to about half the length of the rafter, and thinned out the eyes as follows:—I left the top eye, which I call No. 1, cut out 2 and 3, left 4, cut out 5 and 6, left 7, and so on to the bottom of the cane. This leaves the eyes on alternate sides, and will produce as many bunches as the vine is able to bear, and larger than if all the buds were left on, and allowed to break. The canes were then bent down along the front of the house, and covered up for the winter.

The following spring, they were uncovered about the second week in April, and the lower part of the vine tied to the trellis, with the top bent down. In this position they were allowed to remain until all the buds had broken, when they were tied in their proper place. They were syringed regularly every morning, the borders inside got a thorough soaking of rain water, and were kept moist throughout the growing season. About five or six bunches were allowed to remain on each vine, one only on each spur. They were shortened in one leaf beyond the bunch; and all the laterals during the remainder of the season were kept shortened in the same way. Air was admitted at the top, about 8 a.m., when the weather permitted, and closed early in the afternoon. The crop ripened beautifully, and some of the finest bunches of Black Hamburg, Muscat Hamburg, West's St. Peter's, Lady Downe's Seedling, Royal Muscadine, Rose Chasselas, White Frontignan, Grizzly Frontignan, and Chasselas Vibert, were exhibited at the Autumn Show here, and obtained the leading prizes.

They have continued to bear well each year. Last year and the present, they were particularly fine, the crop averaging about 300 lbs. each year. Mr. Browne's gardener has no pretensions to a knowledge of grape-growing; he merely follows instructions, and, I believe, does it faithfully. When I state that the present year he took the first prize for the best and heaviest bunch of Black Hamburg, the best and heaviest bunch of white grapes, the best and heaviest bunch of black, of any variety (Muscat Hamburg), the best three bunches of black

grapes (Lady Downe's, Muscat Hamburg and Black Hamburg), and the best three bunches of white grapes (Royal Muscadine, White Frontignan, and Chasselas Vibert), all thoroughly ripe and well coloured, it shows that the climate of Canada is particularly well adapted for the cultivation of the European grape under glass, and without fire heat.

To those who are desirous of having grapes early, and, indeed, to all grape-growers, I would recommend the perusal of "Thomson's Treatise on the Vine," where full and particular instructions are given, far better than any I can give you, for the raising and management of the vine, both with fire heat and in cold vineries.

In addition to the varieties named above, all of which I can strongly recommend as first class in every respect, are the following new varieties (which are spoken of very highly in the English gardening periodicals) all of which are to be had here, viz., Golden Champion, Mrs. Pince's Black Muscat, Maddersfield Court Black Muscat, White Lady Downe's, Royal Ascot, Royal Vineyard, Foster's White Seedling Trebbiana, Gros Colman, Golden Hamburg, Buckland's Sweet Water, &c. Many of these have already fruited here, and are really worthy of cultivation; and I am strongly of opinion that many of them will be found to thrive better here than in England, and be a great acquisition.

REPORT OF THE COMMITTEE

Appointed "to examine the country within a radius of fifteen miles about Toronto, and report its capabilities for the production of fruit, its peculiar advantages and disadvantages for such culture, its present fruit products, and such other matters affecting fruit growing, as are worthy of note."

We beg to submit that at the time arranged by us as the best in which to carry out the designs for which your Committee were appointed, the "Epizootic" was raging to such an extent that we could not make such full investigations as we desired, and the subsequent illness of one of your Committee still further disarranged our plans. We have, however, at various times, conjointly and individually been able to visit a considerable portion of this section of country, and obtain notes, which we submit *in extenso*.

The soil is, generally speaking, excellent wheat land, a clay loam, to heavy clay, varying in a few places to sandy loam, and occasionally gravel, but very little of the latter, while such a thing as really bad or barren land is not to be found. The soil is, therefore, capable of the very best results, as regards the production of fruit, while the climate is also favourable, except as to a few points, which we shall hereafter mention. With so much in its favour, and lying contiguous to a great market like Toronto, it is a matter of wonder that fruit-growing, especially "for profit," has not obtained to a far greater extent in this section. This, however, is being fast remedied, as we noticed a great many young orchards, some of them of considerable size, which have been planted during the last two or three years, while grapes and small fruits, generally, are receiving an equal share of attention.

We shall first mention the fruits which are *not successfully grown*, and then pass on to those which are largely cultivated. Notably then the PEACH. For the last 15 years all efforts to succeed with this fruit have signally failed, owing, we believe, to the clearing away of the timber of our country, which has caused a change in climate sufficient to destroy all chance of its ever being grown in large quantity.

Occasionally we met with a few trees which yielded a slight return once in several years, and these were always in particularly favoured positions, with abundance of shelter, sunny aspect and light soil. On the farm of Mr. Hugh C. Thomson, which farm is nearly all of a light sandy loam, some trees have done exceptionally well. It is worthy of remark that previous to the year 1855, peaches were grown with little trouble, and in some profusion. Since that time they have been a failure. The same remarks hold good as to QUINCES; they began to deteriorate about the same time, and now but few trees indeed are to be seen, which bear a few specimens in exceptionally favourable seasons, and which are growing in generous heavy soils.

The ENGLISH GOOSEBERRY, as a rule, does not succeed well, and where anything like success is obtained, it is always on the stiffest clay soil. The bushes thrive and stand our winters well enough, but *mildew* on the fruit destroys the crop before it is in a marketable condition, while the ravages of the "Gooseberry Saw-fly" have caused many to abandon any attempt at their cultivation, even on the smallest scale. Now that the advantages of dust-

ing with sulphur and hellebore are beginning to be known and appreciated, we trust shortly to see renewed efforts to bring this excellent fruit under successful cultivation. The varieties which have succeeded best, so far as we could learn are—*Whitesmith*, *Crown Bob*, *Iron-monger*, *Sulphur Yellow*, *Roaring Lion*, and several of the green kinds.

The *Houghton's Seedling*, an American variety, is largely planted, and does admirably, bearing immense crops; the principal objection to it being the small size of the berry. We hope in time the efforts of the Hybridizer, in raising seedlings, crossed with this variety, or natives of the country, and English varieties may ultimately succeed in overcoming all drawbacks.

NECTARINES and APRICOTS we did not meet with, and know of none being grown in the open air. We have seen the Breda, Purple and Moorpark Apricot trees stand the severest winters for years, but always fail to produce fruit.

The cultivation of the BLACKBERRY is about abandoned. No varieties have yet been introduced which will stand without protection above the *snow line*, and as this line has for some years been about *nil*, the consequence has been *no fruit*. They are so troublesome to cover or protect in winter, that few people will have anything more to do with them.

Of MULBERRIES, several kinds have been tried at various times, but came to no good. The *White Mulberry*, of use only for its leaves, with which to feed the silkworm stands our winters, and does very well. The production of raw silks is a branch of industry which might be developed and made profitable in this section, and certainly deserves more attention in the warmer and more favoured parts of our climate.

We conclude our list of "failures" with the Foreign Grape. Many varieties have been tried, but have done no good. The nearest approach to success has been with the White Sweet Water.

It must be understood that the foregoing remarks refer to the *growth of fruit in the open air*. While unfavourable in this respect, our climate is eminently suited to the production of Foreign Grapes, Peaches, Apricots, Nectarines, Figs, Plums and Pears, under glass, in vineries and orchard houses. We are glad to notice a greatly awakened interest in the growth of Foreign Grapes in

COLD VINERIES,

And have seen and heard of a great many houses in course of erection, or about to be constructed; in fact, it is *becoming fashionable* to have them attached to all houses of any pretensions, and we think with much taste. It has been shown in vineries of some time standing, that this fruit can be produced in quantity and quality, equal to any in North America.

Mr. Philip Browne, of Toronto, has a large number of varieties. His productions at the exhibition of the Electoral Division Society of Toronto this fall, took all the first prizes in every section of the prize list. The following gentlemen also have fine vineries, well established, and annually producing good crops—Messrs. Gzowski, Macpherson, Joseph Leslie, Phipps, Gunther, Mrs. Robinson, *Queen's Park*; Alderman Thomson, *ditto*, and a great many others. All the standard European varieties are in cultivation. Many of the newest varieties from Europe are being introduced. The market price this year opened at \$1.50 per pound, dropping to 50 cents when the native hardy varieties came in.

ORCHARD HOUSES

Have not received as much attention as vineries, but there are several in this section with which the owners are much pleased. We would particularly mention that of Mr. Hugh Gwynne, nine miles west of Toronto, on the Lake Shore road, which is a span roof structure 24 by 16 feet, about 10 feet high in the centre, four feet high at the sides, with roof of moveable sashes. This house produces *splendid* crops, and has continued to do so for the last six or eight years. It is stocked with Peaches and Nectarines and it must be specially mentioned that they are *planted in the ground*, not in *tubs*, as in all other houses about Toronto. The trees receive no protection in winter, except such as is afforded by the building, not even mulching the roots, and stand perfectly. They are managed with the greatest ease, the mode of cultivation being simply keeping the young growth well pinched in, thinning out the branches early in Spring, thinning the fruit when set, and occasional watering and syring-

ing as required. The roof or sashes are completely taken off about the 20th June, and left off till the approach of severe weather. Mr. Gwynne has also a fine Vinery 30 by 20 feet, producing well.

PLANTING FOR SHELTER,

Especially a systematic planting, on the north and west sides of farms for orchard shelter, is treated with an indifference, which we cannot but notice with the deepest regret. The original timber has been almost entirely swept away without any attempt at leaving *belts* for shelter, or replacing by subsequent planting. Some few farms we noticed whose owners were waking up to the importance of remedying this state of things, but not to the extent which this subject demands. The best sheltered orchard we met with, and we think the best in the section is, that of Colonel O'Hara just outside of the western limits of the city. It is completely protected on all sides by a belt of trees, all transplanted trees, and all our native white pine. Most of the trees are now of a large size, and a fine shelter is produced, in consequence of which good crops of fruit are annually gathered, even in the worst fruit years.

We now come to the fruits that can be grown in the open air with the greatest success, where the peculiar requirements of each sort of fruit are complied with. These are apples, pears, cherries, plums, native hardy grapes, currants, raspberries and strawberries.

THE APPLE

Has been extensively planted, though there is room for much further development without any danger of overcrowding the market—in fact the market can really never be overstocked with good keeping varieties, properly packed for shipment, as the demand in the non-producing portions of our own Province of Ontario, the lower Provinces and Great Britain will always absorb our surplus. We have heard of one dealer in Toronto, who has this year gone to England with over two thousand barrels.

The finest orchards coming under our notice were in the Township of Etobicoke, within a short radius of the New Agricultural College farm. This township is becoming famous for its fine apples, and has, this year, we consider, packed as many for shipment abroad as any township in Canada.

The soil is principally a fine clay loam, on which a considerable quantity of limestone is found. We have seen grown here specimens of the "Swayzie Pomme Grise," rivalling in appearance and quality those of the famous Niagara districts. Mr. S. Wood, at Islington, is an intelligent and careful orchardist. His extensive orchard bears marks of the best attention, and the fruit thereof has for years taken prizes at the keenest Pomological competition. Mr. Watson, near Islington, is also an extensive grower and dealer in apples. Near the same neighbourhood the following gentlemen possess good orchards, worthy of particular mention:—Mr. Edward Stock, Mr. Wm. Burgess, Mr. D. McFarlane, Mr. W. Wilson, and Mr. Fisher. With Mr. Fisher the "Yellow Bellflower" does unusually well, several large trees having for years averaged 6 to 7 barrels each per annum. About the village of Weston we noticed good orchards, particularly those of Messrs. John Shuttleworth and Wm. Shuttleworth. Mr. John Shuttleworth has some fine seedlings, two or three of which are very highly thought of, and having been placed under propagation are likely to come into general cultivation. On Yonge street two miles from Toronto, Mr. John Forsyth has an excellent orchard, and his fruit has borne off many prizes at various exhibitions. A mile further, and the extensive young orchard of Mr. James McCarter is to be seen. This gentleman is training all his trees with *low heads*, branching not more than 2 to 3 feet from the ground. His trees are all the picture of health, and are just coming into bearing. Mr. John Whiteside, east of Toronto, near Agincourt, has a splendid young orchard just coming into bearing, which receives from its owner the most careful attention in every detail. We must also commend the orchards of Mr. Thomas Brown, on the Don and Danforth road, Mr. Thos. Whiteside on the Canada road, Mr. Wm. Walton, Mr. Isaac Stobs, Mr. George Taylor, and Mr. James Laurie, in the Township of Scarboro'. Many orchards throughout the whole section are met with, evidencing the greatest neglect, especially in the matter of *pruning*. It is very desirable that a better knowledge of this important adjunct to fruit-growing should prevail. We find a tendency on the part of those who are now planting largely for market to confine themselves to a very few choice varieties, instead of planting a great number of kinds, as used to be the rule some years ago. The six favourite varieties are apparently Baldwin, R.

I. Greening, Northern Spy, King of Tompkins County, Golden Russet, and Fameuse; and where it is desirable to extend the list the choice is usually from the following:—**EARLY**—Early Harvest, Red Astrachan, Keswick Codlin. **AUTUMN**:—Duchess of Oldenburgh, Fall Pippin, (commonly named Holland Pippin), Alexander, Gravenstein, St. Lawrence, Ribston Pippin. **WINTER**:—Yellow Bellflower, Pomme Grise, Roxbury Russet, Swaar, Esopus Spitzenburg, and Wagener.

A great number of other varieties are to be found in the section, some of them of much excellence, but now in little demand by planters. In concluding our remarks on the Apple we would say that Mr. Forfar, of Scarborough, has several seedlings of merit, some of which have been laid before the "Seedling Fruit Committee" of your Society. The *best* seedling apple however, which came under our notice, was raised by Mr. Wm. L. Stotts, of Markham. It is evidently a seedling from the Roxbury Russet, possessing in appearance many of its characteristics. Its keeping qualities are first class, and few apples now in general cultivation can compete with it in point of flavour. Mr. Stotts says the tree is perfectly hardy, and a profuse bearer.

PEARS

Are planted in considerable number, but nothing like an extensive Pear Orchard has come under our notice, except that of Mr. P. McGregor, hereafter mentioned. Mr. Henry Brown, of Yonge-street, has a goodly number of young trees of the most approved varieties just coming into bearing, and which look exceedingly thrifty. Mr. P. McGregor, near the north-western limits of the city, planted out some 300 trees which are doing well. They were planted about 6 years' ago, and are now coming into bearing. A few trees are to be found in nearly every garden and orchard, but the fruit is not produced in anything like the quantity which its great merits, high price in market, and popular demand entitle it to.

There are very few varieties which do not stand the winter and thrive well, and like the apple a very great number of varieties have been planted, but popular favour is fast settling upon a very limited number. The favourites are, Flemish Beauty, Bartlett, Duchess d'Angouleme, Louise Bonne de Jersey, Belle Lucrative, Buffam, Sheldon, Beurre Diel, Beurre Clairegeau, Vicar of Winkfield, and Winter Nelis. There are those who are partial to some or all of the following varieties—Beurre Giffard, Osband's Summer, Tyson Beurre Superfine, Beurre de Waterloo, Grey Doyenne, Swan's Orange, Lawrence, Beurre Easter, Glout Morceau, Josephine de Malines, and Jaminette. Dwarf Pears on the Quince stock succeed well where they receive the requisite attention in the way of proper pruning, proper manuring, and thinning the fruit.

CHERRIES

Have not been so largely planted as pears, probably because it has been found that on rich clay soil they burst the bark badly, and thus soon decay. On lighter soils, however, they do very well. The largest plantations we saw were those of the Messrs. Pope, who have set out several hundred. There is no fruit which responds so generously as this to a careful protection by shelter, and when this is better understood and acted on, plantations will be largely increased. The following varieties are in cultivation:—Kentish or Canadian Red Cherry, Black Eagle, Black Tartarian, Elton, Gov. Wood, Yellow Spanish, Butner's Yellow, Cleveland Bigarreau, Napoleon Bigarreau, Rockport Bigarreau, Elkhorn, Belle Magnifique, Mayduke, Reine Hortense, and English Morello.

PLUMS

Are largely planted, but the "Black Knot" and Curculio on neglected trees, and *there are a good many such*, prevent much of a return in the way of fruit. Where, however, intelligent steps are taken to check the ravages of these pests, the cultivator is usually well rewarded for his labour. We visited the farm of Mr. Brownlie, east of Toronto, near Danforth P. O., on which is a fine plantation of young trees just coming into bearing condition. Mr. Brownlie by the judicious and timely use of the knife, keeps his trees perfectly free from "Black Knot." He has also quite a number of large trees in full bearing. His favourite sorts are the Yellow Egg (or Magnum Bonum) and Yellow Gage. The Yellow and Green varieties of the Plum are found to be freer from the Black Knot than the Red and other shades. We met with the following varieties in addition to the two kinds mentioned:—Bradshaw, Coe's G

Drop, Duane's Purple, Denniston's Superb, Fellemborg, Green Gage, Imperial Gage, Jefferson, Lombard, McLaughlin, Smith's Orleans, Pond's Seedling, Victoria and Washington.

HARDY NATIVE GRAPES

Have of late years received an unusual degree of attention, and every new variety, as it has been introduced, has been eagerly bought and planted. At Cooksville, just outside the limits assigned to your Committee, one of the largest, if not *the largest* vineyard in Canada is established, being about forty acres in extent. It is stocked with a large number of varieties, the Clinton being the leading kind in point of quantity. A description of this vineyard has several times appeared in print, and we think it needless to reproduce one here. Mr. Brownlie, Danforth Road, has a good plantation of about 400 vines, partly trained on trellis and partly to poles. The "Eumelan,"—one of the sorts distributed by your Society to its members—has this year fruited well with him, and he speaks in the highest terms of its merits. He states that, if his choice were confined to two varieties, he would choose the *Delaware* and *Eumelan*. Mr. John Forsyth, of Yonge Street, has over an acre in grapes, and is very successful in their growth. His fruit has taken many prizes at exhibitions. With Mr. Philip Armstrong, one mile north of Toronto, on Yonge Street, the fruit ripens earlier than with any one we have conversed with. His vines are planted in a fine clay loam on a side hill, facing the south. The Concord is an especial favourite with him, as with a great many other cultivators. At Markham, twenty miles east of Toronto, the Hon Mr. Reesor has established a large vineyard, if we are correctly informed (we regret we had not an opportunity of visiting him) numbering about 5000 vines. He trains his vines very low, so that the fruit is all produced within three feet of the ground, and is well pleased with his success.

The varieties we have noticed most largely in cultivation, are Delaware, Concord, Hartford Prolific, Clinton, Creveling, Salem, and Rogers' 15 and 19.

CURRENTS.

It was feared two or three years ago that the red and white varieties of this fruit would be driven out of cultivation by the "gooseberry sawfly," or "currant worm;" but now that it is known with what little trouble this pest can be kept under by the use of white powdered hellebore, renewed attention is being paid to its culture, and the quantity of fruit disposed of this summer in Toronto markets at very profitable prices, was really enormous. The demand for black currants could not be met this year, and the *wholesale* price ranged from \$4 to \$4.50 per bushel. We were allowed the privilege of tasting a *wine* made from black currants, and now two years old, which was perfectly delicious, and strongly resembled, in taste and colour, the finest old Port. The favourite varieties in cultivation are Red Grape, Shortbunch Red, Red Cherry, White Grape, White Dutch, and Black Naples.

RASPBERRIES.

Are grown in every private garden in the district, and every market gardener near the City has a "patch" to fruit for market. Some of these are large, and the owners consider the fruit a very profitable crop. The two largest plantations we saw are those of Mr. Denison, near Brockton, and Mr. John Hamilton, near the north-eastern limits of the city—the plantation of the former being about four acres, and that of the latter two acres, in extent. The varieties most largely grown are Franconia, Philadelphia, Red Antwerp, Brinckle's Orange, and the American Black Cap. The Philadelphia and American Black Cap stand perfectly without protection in the winter—the other varieties are much better for being protected.

STRAWBERRIES

Are also largely cultivated, especially for market, and prices obtained have always heretofore been profitable. The most largely grown sorts for this purpose are the Wilson's Albany and Triomphe de Gand, notably the former, which is the most productive berry known. Juncunda is a good cropper, and a splendid berry on rich *clay* soils. The Agriculturist also does well on same kind of soil. Downer's Prolific is a very hardy plant here, a good bearer, and large berry, but is too soft to bear carriage to market. Nicanor is liked by many growers for its several good qualities. Besides these sorts, there are many others to be found in private

gardens, but none which can be said to excel them. In the neighbourhood of Port Credit are some large plantations, and this locality is beginning to rival Oakville in this respect. At the Highland Creek there is a five-acre field which produces extraordinary crops.

CRAB APPLES

Should have been mentioned in connection with our remarks on the apple. Being very hardy, they succeed admirably, and never fail in any season to bear large crops. The varieties principally cultivated are Transcendant, Montreal Beauty, Golden Beauty, and Yellow Siberian.

THE FRUIT CROP

This year of grace 1872, has not been what may be termed a "good fruit year." Pears and currants are the only fruits that have done well; all others have been below the average. Prices have, however, ruled high, which, to the "growers for profit," has nearly made up the deficiency in quantity of fruit.

In concluding this Report, we would mention that we met with a great many complaints from parties who had purchased trees from an American firm of *tree dealers* (who are not themselves the *growers*), who brought into Canada from the United States, last spring, a very large number of fruit trees. From investigations made by us, we are informed that the trees were principally grown in Southern Pennsylvania. They were of rank growth and handsome appearance, but not being suitable to our climate, fully three-fourths of them have died.

All of which is respectfully submitted.

GEO. LESLIE, JUN.
JOHN GRAY.

REPORTS ON SEEDLING FRUITS.

ON SEEDLING APPLES.

These were received from Mr. J. W. Johnston, of Campbellford.

The committee beg to report first, touching the seedlings raised by Mr. D. Johnston of Campbellford: That they are of medium size, splashed and marked with light and dark red, yellow on ground with a dark red cheek where exposed to the sun. Stem very short; set in a wide cavity of medium depth; Calyx closed and set in shallow corrugated basin. The apple has a diameter one-third greater in its transverse section, than from stem to Calyx. Core large for size of fruit, containing a medium number of sound seed which rattle within the core of the apple when shaken. Flesh, white, juicy, with a mild pleasant, sub-acid and agreeable flavour, in general appearance resembling the Fameuse.

We would recommend a bonus of five dollars, to be given to Mr. D. Johnston, on his furnishing the required information to the Secretary of the Fruit Growers' Association, that the above described variety is a seedling raised by himself.

As to the Russets submitted to us, received per same package from Mr. O'Reilly, near Colborne, also supposed to be seedlings, we believe them to be small and poor specimens of the Golden Russet of Western New York.

In reference to the apple from Mr. Diamond of Campbellford, it is of large size, handsomely striped and resembles somewhat the St. Lawrence, but over ripe and not in a condition to enable us to form a correct judgment of its merits.

All of which is duly submitted,

W. HOLTON.
W. H. MILLS.
ROBERT BURNET.

Hamilton, 13th February, 1872.

Mr. D. Johnston of Campbellford, says of it, that his father planted some apple seeds and raised from them the tree that bore this fruit, and other trees. This tree has been in bearing for twenty-nine years, and is a hardy and productive tree, bearing every year, and

yielding last year fifteen bushels of apples. The fruit is good for either kitchen or table use, and commands as high a price in market as any of the grafted sorts.

ON SEEDLING CHERRY.

This cherry was received, June 22nd, from James Dougall, Esq., of Windsor.

It is a black sweet cherry, partially mouldy, and in such condition as to make it difficult to report with entire justice, touching its merits. We regret that Mr. Dougall had not notified the Fruit Growers' Association, so that a committee might have been appointed to visit the tree in bearing, and we hope he may do so another season. The combined earliness and fine sweet flavour which may be fairly compared in flavour and size to later varieties, make it most desirable, that this new seedling so much like the old Black Hart, should have a full and careful report. We are of opinion that should the tree bearing this extremely early fruit, which is stated to ripen before the early Purple Guigne, prove hardy and prolific, it must take its place as a decided acquisition to our list of cherries.

WM. H. MLLLS.
ROBERT BURNET.

ON SEEDLING APPLES EXHIBITED AT THE WINTER MEETING.

Mr. Holton of Hamilton, exhibited a seedling apple, below medium, pretty, not high flavoured.

D. McPherson, Front Lancaster, sent two samples, numbered one and two, but they were over ripe and in bad order.

A. Morse, Smithville, brought some seedlings. Number one was of large size, striped, firm, nearly sweet, a good keeper. Number two was lacking in flavour.

John McGill, of Oshawa, exhibited an apple of medium size, striped, of mild and pleasant flavour.

D. Hammond, Sheridan, showed one apple, handsome in appearance and of pleasant flavour.

Joseph Neff, Port Colborne, brought another, but the specimens were in bad condition.

A. C. Attwood, of Vanneck, sent again some apples which he had previously brought to the attention of the committee, supposing them to be a new variety, but it now appears that it has been more widely disseminated than was supposed, samples having been also received from Ancaster and London, as an imported sort. It is therefore not entitled to be brought in competition for the prize offered for Canadian seedling apples.

ON SEEDLINGS SENT TO THE FRUIT COMMITTEE.

James Walsh, Birkhall, raised some seedling apple trees which bore fruit this season, one of which proves to be a Red Crab. He did not sow any seed from the Crab, and is at a loss to account for its appearance in his batch of seedlings. This new variety of Crab in point of size and general appearance does not seem to be any improvement on known and generally cultivated varieties.

D. Hammond, of Sheridan, sent an apple. It is medium to large, flattened conical, smooth, greenish white in the shade, mottled with crimson, and splashed with deeper crimson; stem long and slender, set in a broad, open and deep cavity; calyx closed, in a shallow, slightly corrugated basin; flesh white, fine grained, very juicy, crisp, pleasant sub acid, quality *good*. Ripe, October.

A. Morse, Smithville, sent again samples of his large green apple. As this apple can only be valuable for cooking, and is in use at the same time with other well known fruits of much finer appearance, and fully equal if not better in quality, the Committee are of opinion that it is not desirable to disseminate it.

J. Cowherd, Newport, sent several of his apples.

No. 1. Large, form varying from nearly conical to oblate, skin smooth, pale greenish yellow, deep crimson on the exposed side, striped and splashed with darker crimson, the crimson splashes continuing on the shaded side. Flesh nearly white, with an occasional

pink tinge ; not very fine grained, juicy, crisp, sub-acid, not rich nor high flavoured ; quality *good* ; stem, very short, stout, in a deep, russeted cavity ; calyx closed, segments reflexed, in a shallow, slightly corrugated basin. Ripe, end of September.

No. 32. A little above medium, oblate, skin smooth, dull crimson in the sun, greenish yellow in the shade. Stem stout, $1\frac{1}{2}$ inches long, set in russeted, medium cavity. Calyx closed, in a shallow, corrugated basin. Flesh, yellowish white, fine grained not very juicy, acid ; quality *poor*. Ripe, end of September.

Mr. Cowherd says of these seedlings :

"No. 1. Is 23 years old, very hardy, growth strong and spreading ; a regular bearer.

No. 30. A fine, free grower ; first time bearing.

No. 31. Growth spreading ; first time bearing.

No. 32. Growth strong, thin, and spreading ; been in bearing three or four years."

Mr. Hammond says of the apple sent by him :

"I send by express some seedling apples (fall fruit) for competition. They are a very fine cooking apple, just now in season for picking, and if put by for a few days, they are a fine dessert or table apple. The tree is a very hardy and fine growing one, good bearer, promises to be very productive. The original tree is (or was) in the neighborhood of St. Catharines, about six miles south-west of that place, in the orchard of Mr. George Oille, from which I obtained a sprout some few years ago."

SMITH'S GOLDEN PIPPIN.

Fruit large, twelve inches in circumference, ovate in form, skin smooth, yellowish green, with a warm carmine blush on the exposed side, breaking into faint marblings of carmine at the edges. Stem short, set in a deep, narrow cavity, under a projecting lip, which lip is usually thinly covered with russet. Eye closed, in a shallow, somewhat corrugated basin. Flesh, yellowish white, fine grained, juicy, sub-acid, not high flavoured ; quality *good*.

All of which is respectfully submitted,

D. W. BEADLE,
W. H. MILLS,
R. BURNET,
W. SAUNDERS.

ON THE SEEDLING PLUM EXHIBITED BY A. GLASS, OF GUELPH.

The Committee having examined this plum, beg to report that the tree seems to be of a very healthy habit, a vigorous upright grower, holding its foliage quite late in the season, the leaves are very large, thick, of a dark green colour, the upper surface very glossy. The fruit is very large, oval, dark purple, covered with a thin bloom, separating freely from the stone. Flesh, not very fine grained, juicy, sweet, not high flavoured ; quality, good to very good, keeping remarkably well.

We take the liberty of suggesting to the Directors that, if arrangements can be made with Mr. Glass to supply the requisite number of trees, this plum is worthy of being distributed among the Members of our Association, for more extended trial.

We append Mr. Roy's letter, one of the Committee appointed to examine this fruit, who was unable to meet with us.

R. BURNET,
GEO. LESLIE, JR.,
D. W. BEADLE.

LETTER OF S. ROY, BERLIN, RELATING TO THE GLASS SEEDLING PLUM.

"BERLIN, 23rd October, 1872.

D. W. BEADLE, Esq.

DEAR SIR,—Having fruited the Glass seedling plum the past season, I must say that I am well pleased with it, and have no hesitation in stating that it would be quite an acquisition in any collection, as it is much superior to many of the same class in general cultivation.

Although not of the *best* quality, its productive character and general healthiness will make it a favourite with market gardeners, as the fruit is well adapted for canning.

The glossy appearance of its foliage indicates that it belongs to the Damson class, of which it certainly is a monstrous specimen. I think it is distinct from others of the same type, of which I have two specimen trees, viz: the Quackenbush and Hustand blue, obtained from my neighbor, Mr. Schofield—none of which come up to it in size of fruit—this being the only distinctive difference that I can observe among the three varieties, all of which are very hardy and healthy trees, and, as a general thing, not subject to black-knot—rather troublesome among Damsons—as a rule.

Whether it is distinct from any other variety in cultivation I know not; but, be that as it may, I have no hesitation in stating that its general distribution throughout the country will be of greater benefit than many of a finer quality, with a doubtful reputation as to hardihood, of which the McLauchlan was a notable instance. I tell you it takes an iron constitution in a tree to stand the severity of the winters in the central Counties, consequently it requires greater care and greater ingenuity to be successful in fruit growing here than with you.

I may further remark that the Glass seedling is a superior plum in every respect to the Duane's purple, as that variety is very subject to leaf-blight here, and it is also superior to the Diamond, as that tree is too tender to be grown successfully here.

I am yours truly,
SIMON ROY.

PRIZE LIST.

PERMANENT PRIZES.

First.—AN HONORARY MEDAL to the originator of any new fruit which, having been thoroughly tested for a series of years, is found to be worthy of being placed among the fruits of its class for cultivation in Ontario.

Second.—FIFTY DOLLARS for the best Canadian Seedling late Winter Apple, to be at least equal to the old popular varieties now in cultivation.

Third.—THIRTY DOLLARS for the best Canadian Seedling Harvest Apple of like merit.

Fourth.—TWENTY DOLLARS for the best Canadian Seedling Autumn Apple of same excellence.

ANNUAL PRIZES.

PRIZES FOR 1873.

First.—Awards may be made by the Committee on Seedling Fruits of sums *not exceeding Ten Dollars* for any seedling fruit that may be submitted to them during the year which they may deem worthy, although they may not yet be prepared to advise the Directors to bestow either of the permanent prizes. Such award shall not in any measure disqualify the exhibitor from eventually receiving, for the same fruit, one of the permanent prizes.

Second.—TEN DOLLARS for the best Winter Seedling Apple, fruit to be grown in 1873, and exhibited at the succeeding winter meeting of the Association.

Third.—FIVE DOLLARS for the best Autumn Seedling Apple to be shown at the next annual meeting of the Association.

Fourth.—FIVE DOLLARS for the best Summer Seedling Apple, to be sent when in condition for examination to the President, Rev. R. Burnet, Hamilton, all charges prepaid, and to be by him submitted to the Committee.

Fifth.—FIVE DOLLARS for the best Seedling Winter Pear, fruit grown in 1873, and exhibited at the succeeding winter meeting of the Association.

Sixth.—FIVE DOLLARS for the best Seedling Autumn Pear, to be shown at the autumn meeting.

Seventh.—FIVE DOLLARS for the best Seedling Summer Pear, to be sent, when in

condition to be examined, to the President, Rev. R. Burnet, Hamilton, carriage prepaid, for submission to the Committee.

Eighth.—FIVE DOLLARS for the best Seedling Plum to be sent to the President, when in season.

Ninth.—FIVE DOLLARS for the best Seedling Peach, to be sent to the President, when in season.

Tenth.—FIVE DOLLARS for the best seedling Grape, of any colour, to be sent to the President, when ripe.

Eleventh.—FIVE DOLLARS for the best Seedling Strawberry, to be sent if possible, to the summer meeting ; if not possible, then to the President.

Twelfth.—FIVE DOLLARS for the best Seedling Raspberry, to be sent, if possible, to the Summer Meeting ; but if that be impracticable, then to the President, when in season.

Thirteenth.—FIVE DOLLARS for the best Seedling Gooseberry that is not subject to mildew, whether of European or American parentage, or a cross between them ; to be sent to the Summer Meeting, if possible, otherwise to the President.

Fourteenth.—FIVE DOLLARS for the best Seedling Blackberry sufficiently hardy to endure the climate of Ontario. Fruit to be sent to the President, when ripe.

Should two or more Seedlings of equal merit be shewn, the prize shall be awarded to each. The Committee shall in all cases withhold the prize altogether, if they do not deem the fruit worthy.

A Seedling to which one of these annual prizes has been awarded, cannot compete a second time in this class, but may compete in the class of Permanent Prizes.

A Seedling Apple which has received one of the money prizes in the class of Permanent Prizes cannot again receive a money award, but may be offered in competition for the Honorary Medal.

CERTIFICATES OF MERIT.

Seedling fruits which have received any of the foregoing money prizes may be offered in competition for certificates of merit.

There are two certificates of merit : the highest is known as the FIRST CLASS CERTIFICATE, the other as the SECOND CLASS CERTIFICATE.

The Committee will report to the Directors those fruits which they think to be worthy, stating which certificate they think it to be worthy to receive. The Directors will then make full inquiry and examination concerning the character of the fruit, including size, appearance and quality, the habit, vigour, health, hardihood and productiveness of the tree or plant, and its general adaptation to the climate of Ontario, and bestow such certificate, if any, as they may think it worthy to receive.

A fruit which has received a Second Class Certificate may afterwards receive a First Class Certificate, if thought worthy ; and a fruit which has received a First Class Certificate may be offered in competition for the Honorary Medal.

The Honorary Medal may be given any number of times to the same person for different fruits, but only once for any one fruit.

Seedling fruits offered in competition for these prizes must be shown in quantities of not less than *one dozen specimens* of each sort, if they be Apples, Pears, Plums or Peaches ; if Grapes, not less than *three bunches* ; if Berries, not less than *one quart*. Each sort or variety must be accompanied by a statement, signed by the person sending the fruit, setting forth the origin of the tree or plant, if known ; if the origin be unknown, then so much of the history of the tree or plant yielding the fruit sent as may be ascertained—its vigour, hardihood and productiveness, the character of the soil in which it is growing, and what, in the estimation of the sender, are the peculiar excellencies of the fruit. This rule must be observed in all cases, whether the fruit be shewn at the meetings of the Association or sent to the President for the examination of the Committee.

ESSAYS.

First.—TWENTY-FIVE DOLLARS for the best essay on the cultivation of the Plum, including a short description of the varieties with which the writer is acquainted, and his opinion of the merits of each.

Second.—TWENTY-FIVE DOLLARS for the best essay on the cultivation of the Pear, including the mode of keeping and ripening, together with a short description of the varieties known to the author, and his opinion of the merits of each.

Third.—TWENTY-FIVE DOLLARS for the best essay on how best to increase the interest in fruit growing in Ontario.

Fourth.—TWENTY FIVE DOLLARS for the best essay on the impositions of dishonest tree-pedlars.

Essays to be sent to the Secretary on or before the first day of November, 1873, each bearing a motto, and accompanied with a sealed note having the same motto endorsed on the outside, and containing within the name of the author. Judges may withhold the prizes, if they do not think the essays worthy.

DISTRIBUTION OF FRUIT TREES.

The Directors desire to intimate to the members of the Association, that they are making arrangements to distribute trees &c. as follows:—

In 1873.

The Grimes Golden Pippin Apple.
The Clapp's Favourite Pear.

In 1874.

The Downing Gooseberry.
Barry (Rogers No. 43) Grape.

In 1875.

The Swazie Pomme Grise Apple.
The Goodale Pear.

In 1875.

The Tetofsky Apple.
The Glass Seedling Plum.

These will be distributed to all members, new and old, who shall send their annual fee of One Dollar to the Secretary, on or before the first day of March in each year.

The object of making this distribution is to ascertain how valuable these several varieties may prove to be in the localities to which they are sent; hence the distribution is made on the condition that those receiving them will make a yearly report to the Secretary thereon, for five years.

Will our members be so good as to remember that, by accepting these trees, they pledge themselves to take care of them, not so much for their own personal advantage, as for the benefit which their trial of them will be to others.

NEW MEMBERS.

It being the object of this Association to disseminate information concerning fruits and their culture, the Directors wish every member to make his neighbours acquainted with the benefits to be derived from joining the Fruit Growers' Association of Ontario.

In order to make some return to those who take the trouble to procure new members, the Association instructed the Directors to send, free of expense, an additional allowance of trees for every five new-members obtained. The Directors, therefore, give notice that they will send to every member who sends to the Secretary the names and fees of new members, on or before the first day of March in each year, an additional allowance of trees for every five new members obtained, with the privilege of selecting instead, if they prefer, any trees, plants, vines, shrubs, roses or flowers which may be obtainable, to the value of the extra allowance to which they may be entitled. This will give members an opportunity of obtaining any particular plant they may desire, and to those ladies who are or may become members, the privilege of gratifying their taste for home adornment. And as

some members have urgently requested that the CANADIAN FRUIT, FLOWER & KITCHEN GARDENER should be distributed instead of trees, the Directors offer to send, free of expense, a copy of that work to each member who shall obtain *fifteen* new members, and desire to have the book instead of the allowance of trees.

Three thousand copies of the Report for 1872 will be printed. A copy will be sent to all who are now members, and also to those who may become members, in the order in which their subscriptions are received, until the edition is exhausted.

It may happen that the increase of members shall be so large as to render it impossible to procure a sufficient number of the particular kinds which are being sent out to supply all with those sorts; in that case, some other choice variety of the same fruit will be sent instead. Those who send in their subscriptions after the first of March, must expect to be disappointed, for it is absolutely necessary to order trees by that time in order to procure them. No single nursery firm has yet been found who could furnish all the trees required, hence it has been necessary to obtain a part in one place and part in other places, involving extended correspondence and a considerable lapse of time. Please, then, to send in your subscriptions not later than the first day of March.

CORRESPONDENCE.

Correspondence has been opened with the Royal Horticultural Society, England, with a view to an exchange of grafts and cuttings of desirable fruits. The reply received from the Society was most cordial, and was accompanied with a consignment of grafts and cuttings, which arrived in good order.

Prof. Dyer kindly says, in his letter of March 1st, 1872: "The Royal Horticultural Society will have great pleasure in rendering you any further assistance in its power to enable you to carry out the objects you have in view. May I ask you to be so good as to favour me with either a list of your desiderata, or a catalogue of the kinds you have. This will enable us to send you, towards the end of the year, a further contribution. We shall be glad to receive in exchange any kinds which you may think it desirable for us to make a trial of. They should be sent to Mr. Barron, Royal Horticultural Society's Gardens, Chiswick, London."

A full list of the different varieties of Apple, Pear, Plum, Cherry and Hardy Grape, of which scions or cuttings could be furnished by this Society, has been sent to Prof. Dyer.

Correspondence has also been opened with the Department of Agriculture at Washington, and an exchange of Reports effected, which may be followed by an exchange of scions and cuttings.

We also maintain correspondence with our sister Society in Nova Scotia, and make interchanges of scions and cuttings.

From the cuttings sent by the Royal Horticultural Society, plants have been raised of the following kinds of Exotic Grapes, which will be furnished, without charge, to any member who will apply to the Secretary for them. Their names are as follows:—Muscat of Alexandria, Royal Muscadine, Chasselas Vibert, Frankenthal, Crawford Muscat, Black Monukka, Gros Guillaume, Black Prince, Chasselas Rose de Falloux, Dutch Hambro, Royal Ascot, Gros Colman, Alicante, Lady Downe's Seedling, Golden Hambro.

Next year, we will be able to furnish a few trees of the several kinds of Apple of which scions were also received from the Royal Horticultural Society. A list of the names of those that can be supplied will be given in our next Report.

CONSTITUTION

AND

BY-LAWS

OF

Fruit Growers' Association of Ontario,

TOGETHER WITH A LIST OF MEMBERS.

PREAMBLE.

WHEREAS fifty persons and more have organized and formed themselves into a Fruit Growers' Association, by signing a Declaration in the form of schedule "B," annexed to the Act 31st Vic., Chap. 23, Province of Ontario, and have severally subscribed to the fund thereof the sum set opposite their respective names, in compliance with the 32nd section of said Act, and have sent a duplicate of said Declaration, written and signed, as by law required, to the Commissioner of Agriculture.

AND WHEREAS the said Commissioner of Agriculture, as by law directed, did, on the fourth day of April, A. D. 1868; in the *Ontario Gazette*, give notice of the formation of the said Society as the "Fruit Growers' Association of Ontario," in accordance with the provisions of the said Act: And whereas the said fifty persons and others, by such Act have become incorporated, they hereby establish the following Constitution and By-Laws for the good government of such Association:—

CONSTITUTION.

ART. 1.—This Society shall be called the "Fruit Growers' Association of Ontario."

ART. 2.—Its objects shall be the advancement of the science and art of Fruit Culture, by holding meetings for the exhibition of Fruit, and for the discussion of all questions relative to Fruit Culture, by collecting, arranging and disseminating useful information, and by such other means as may from time to time seem advisable.

ART. 3.—The Annual General Meeting of the Association shall be held at the place and during the same time as the Exhibition of the Agriculture and Arts Association is being held, in each and every year. Two other General Meetings shall be held in each year, at such time and place as shall be designated by the Association.

ART. 4.—The Officers of the Association shall be composed of a President, Vice-President, Secretary-Treasurer, and nine Directors.

ART. 5.—Any person may become a member by an annual payment of One Dollar; and a payment of Ten Dollars shall constitute a member for life.

ART. 6.—The Constitution may be amended by a vote of a majority of the members present at any regular meeting, notice of the proposed amendments having been given at the previous meeting.

ART. 7.—The said Officers and Directors shall prepare and present to the Annual Meeting of the Association a Report of their proceedings during the year, in which shall be stated the names of all the members of the Association, the places of meeting during

the year, and such information as the Association have been able to obtain on the subject of Fruit Culture in the Province of Ontario during the year. There shall also be presented at the said Annual Meeting a detailed statement of the receipts and disbursements of the Association during the year, which Report and Statement shall be entered in the journal, and signed by the President as being a correct copy; and a true copy thereof, certified by the Secretary for the time being, shall be sent to the Commissioner of Agriculture within fourteen days after the holding of such Annual Meeting.

ART. 8.—The Association shall have power to make, alter or amend By-Laws for prescribing the election of Officers, and otherwise regulating the administration of its affairs and property.

BY-LAWS.

1. The President, Vice-President, and Secretary-Treasurer shall be *ex officio* members of all Committees.

2. The Directors may offer premiums to any person originating or introducing any new Fruit adapted to the climate of the Province, which shall possess such distinctive excellence as shall in their opinion render the same of special value; also for Essays upon such subjects connected with fruit growing as they may designate, under such rules and regulations as they may prescribe.

3. The Secretary shall prepare an Annual Report, containing the minutes of the proceedings of meetings during the year, a detailed statement of receipts and expenditures, the reports upon fruits received from different localities, and all Essays to which prizes have been awarded, and such other information in regard to fruit culture as may have been received during the year, and submit the same to the Directors, or any Committee of Directors appointed for the purpose; and with their sanction, after presenting the same at the Annual Meeting, cause the same to be printed by and through the Publication Committee, and send a copy thereof to each Member of the Association, and to the Commissioner of Agriculture.

4. Five Directors shall constitute a quorum, and if at any meeting of Directors there shall not be a quorum, the members present may adjourn the meeting from time to time, until a quorum shall be obtained.

5. The annual subscription shall be due in advance at the Annual General Meeting.

6. The President (or in case of his disability, the Vice-President) may convene Special Meetings, at such times and places as he may deem advisable, and he shall convene such Special Meetings as shall be requested in writing by five members.

7. The President may deliver an Address on some subject relating to the objects of the Association at the Annual General Meeting.

8. The Treasurer shall receive all moneys belonging to the Association, keep correct account thereof, and submit the same to the Directors at any legal meeting of such Directors, five days' notice having been previously given for that purpose.

9. The Directors shall audit and pass all accounts, which, when approved of by the President's signature, shall be transmitted to and paid by the Treasurer.

10. It shall be the duty of the Secretary to keep a correct record of the proceedings of the Association, conduct the correspondence, give not less than ten days' notice of all meetings to the members, and specify the business of Special Meetings.

11. The Directors, touching the conduct of the Association, shall at all times have absolute power and control of the funds and property of the Association, subject, however, to the meaning and construction of the Constitution.

12. At Special Meetings no business shall be transacted except that stated in the Secretary's circular.

13. The order of business shall be:

1. Reading of Minutes.
2. do. of Directors' Reports.
3. do. of Treasurer's do.
4. do. of Prize Essays, if any.
5. President's Address.
6. Election of Officers.
7. Miscellaneous business.

14. These By-Laws may be amended at any General Meeting, by a vote of two thirds of the members present.

15. Each member of the Fruit Committee shall be charged with the duty of accumulating information touching the state of the Fruit crop, the introduction of new varieties, the market value of fruits in their particular section of country, together with such other general and useful information touching the fruit interest as may seem desirable, and report in writing to the Secretary of the Association, on or before the fifteenth day of September in each year.

16. Whereas the President or Vice-President and Secretary, as *ex-officio* members of the Board of Directors and of all Committees, should be present at all meetings wherever they may be holden; their reasonable travelling expenses shall be provided from the funds of the Association.

17. The Annual Meeting of the Association shall be held on some evening during the Exhibition week, to be fixed by the Directors, after consultation with the Board of Agriculture and Arts; at which meeting the President may deliver his Annual Address, and Essays on Fruit Culture be read.

LIST OF MEMBERS OF THE FRUIT GROWERS' ASSOCIATION OF ONTARIO.

ADDINGTON.		Harpin, J. B.	Brantford.
No Members.		Hamilton, Robert	do
		Hardy, George	do
		Hargraves, John	do
		Harrison, Thomas	do
		Hart, E. G.	do
		Heyd, Chas.	do
BRANT.			
Allen, W. H. (Dr.)	Brantford.		
Bardon, Rev. Mr.	do	Irwin, Francis	do
Baldwin, M. D.	do		
Bell, Alexander M.	do	Jackson, Joseph	do
Bennett, A. B.	do	Jarvis, Charles, jun.	do
Brethour, H. W.	do	Jenkins, John	do
Belding, W. W.	do	Jones, Walter	do
Brenden, Frederick	do	Jones (Judge)	do
Brown, Robert R.	do		
Buck, William	do	Ker, James	do
Buck, Ensign	do	Ker, John	do
Buck, James	do	Ker, W. H. C.	do
Burnley, Thomas	do	King, George	do
Chane, Walter	do	Laycock, Mrs.	do
Crawford, Thomas D.	do	Laycock, Nelson	do
Carlyle, Thomas	do	Lethbridge, John W.	do
Carpenter, Cyrus	do	Long, William	do
Cleland, William	do		
Clement, Joseph D.	do	Madden, James	do
Creyk, James	do	Mann, William	do
Cowherd, James	do	Marow, John	do
Cockshute, J.	do	Muirhead, Andrew	do
Curtis, D.	do	McGeary, John	do
		McKay, Hugh	do
Edgar, John	do	McMan, Thomas B.	do
		McMaster, James	do
Farr, Joseph	do		
Fenton, James	do	Nelles, A. (Rev.)	do
Fitch, B.	do		
Foulds, Daniel	do	Oxteby, Richard	do
Foster, Francis	do		
Gorman, Charles	do	Passmore, E. C.	do
Good, Thomas A.	do	Passmore, Francis	do
		Passmore, Samuel	do

Penfold, Charles	Brantford.
Pearce, Richard	do
Plews, D.	do

Roddick, William	do
Robinson, Joseph	do
Rowe, Jabez	do
Russell, R.	do

Sanderson, William	do
Shackell, W. W.	do
Spencer, Hugh	do
Spencer, Thomas	do
Spence, David	do
Smith, George	do
Smith, John (Sheriff)	do
Smith, W. A.	do
Sims, Edwin	do
Strickland, John	do
Sowden, John	do
Storey, Richard	do
Sutherland, John	do

Turner, Robert	do
Turnbull, P.	do

Waterous, A. T.	do
Watson, Thomas	do
Wallace, James	do
Waterous, August T.	do
Watts, Alfred	do
Watkins, William	do
Welding, W. E.	do
Webster, Thomas	do
Wightman, Charles	do
Woods, James	do
Wood, (Rev.) John	do
Workman, Hugh	do

BRANT.

Armstrong, Thomas	Paris.
Arnold, John	"
Arnold, Charles	"

Bell, Benjamin	Saint George.
Burrell, William	Onondaga.
Burt, Daniel	Harrisburg.

Charlton, John T.	Newport.
Cole, John	Cainsville.

Grace, James	Mohawk.
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Hamilton, N.	Paris.
Hart, H.	"

Johnson, Jos.	Cainsville.
Johnson, G. H. M.	Tuscarora.

Latshaw, Henry	Paris.
Little, John	"
Little, James	Glen Morris.
Lourason, Miller B.	Harrisburg.

Moyle, William	Paris.
McEwan, Duncan	Mohawk.

Randall, E.	Paris.
Reid, David	St. George.
Smith, Russell	Fairfield Plain.

Whelpton, John	Cainsville.
Whitelaw, Charles	Paris.
Wilson, George D.	Newport.

BRUCE.

Allen, James	Allenford.
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Bull, William	Colpoys Bay.
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Campbell, Rev. Thos.	Wiarton.
Glendinning, William	Walkerton.
Cooke, John	Dungannon.

Dance, John	Colpoys Bay.
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Faulds, A. J.	Walkerton.
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Gould, George	Walkerton.
Gowanlock, Robert	"

Hall, John	Pinkerton.
Howe, James	Skipness.
Hurrell, Jno.	Carlsruhe.
Hurst, Thomas	Wiarton.

Keillors, James	Gresham.
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Mackintosh, A. St. J.	Walkerton.
McLay, John	"
McLean, Malcolm	"
McNab, Alexander	Saugeen.

Ottewell, Richard	Clavering.
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Richardson, William	Walkerton.
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Sherlock, Lagnford S.	Southampton.
Simpson, William	Parkhead.
Softly, Samuel	Teeswater.

Todd, H. W.	Walkerton.
Todd, Thomas, Sen.	"

Waterson, James	Walkerton.
Watt, John	Kincardine.
Walker, Joseph	Walkerton.
Webb, John	Pinkerton.
Wells, John M.	"
Weiser, Louis	Walkerton.
Wilson, William	"

CARLETON.

Ashworth, J.	Ottawa.
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Barrett, M.	Ottawa.
Bell, William	New Edinburgh.
Bucke, P. E.	Ottawa.

Fowler, John	Ottawa.
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Cameron, M.Ottawa.
 Cruse, Thomas..... “
 Durie, J.....Ottawa.
 Greenfield, S.....Ottawa.
 Lewis, F.Ottawa.
 Mattheson, D.....Ottawa.
 Moore, Alfred Henry..... “
 Ross, P.Ottawa.
 Surtees, Robert,.....New Edinburgh.
 Taylor, W. P.....Fitzroy Harbour.
 White, William.....Ottawa.
 White, N..... “
 Young, S. A.....Ottawa.

DUNDAS.

No Members.

DURHAM.

Aylwin, HoracePort Hope.
 Bragg, —Port Hope.
 Brand, John “
 Benson, Thomas M..... “
 Beman, E. C.Newcastle.
 Bethune, Rev. C. J. S...Port Hope.
 Caldwell, S.....Port Hope.
 Caldwell, Captain “
 Crawath, Joseph..... “
 Chisholm, D. “
 Choate, AaronPerrytown.
 Coleman, PeterBowmanville.
 Fraser, William.....Port Hope.
 Foot, John “
 Foster, Captain “
 Hayter, A. E.....Millbrook.
 Jones (Capt.) E. (R.N.)...Port Hope.
 Marsh, Schuyler S.Port Hope.
 Mitchell, W. T. “
 McLaughlin, GeorgeTyrone.
 Oke, ThomasPort Hope.
 Pontchard, WilliamMillbrook.
 Quinlan, Cornelius.....Port Hope.
 Reeves, James.....Port Hope.
 Robertson, James “
 Ross, Lewis..... “
 Russell, SamuelMillbrook.

Sanderson, George.....Millbrook.
 Sanderson, R. “
 Smith, George.....Port Hope.
 Tempest, W. S.....Port Hope.
 Trenbeth, Richard..... “
 Thompson, Godfrey S... “
 Tucker, J. L.....Orono.

Vinden, E. S.....Port Hope.
 Walker, Hugh A.....Port Hope.
 Welch, Thomas “
 Winslow, GeorgeMillbrook.
 Wood, A..... “

ESSEX.

Armstrong, William.....Windsor.

Baby, John C.Windsor.
 Blackader, J. W..... “
 Black, James..... “
 Bartlett, Alexander..... “
 Bartlett, George..... “
 Bartlett, James..... “
 Bell, Jno. F..... “
 Benson, William “
 Buchan, William..... “

Cameron, Donald.....Windsor.
 Clarke, Charles..... “
 Casgrain, Chas. E. (M.D.) “
 Cowan, William F..... “

Dougall, Charles R.....Windsor.
 Dougall, F. J..... “
 Dougall, James..... “
 Dougall, John..... “

Fraser, James.....Windsor.
 Fellers, George..... “
 Fergus, Robert “
 Fletcher, D..... “
 Foster, R. Porter..... “

Grant, George.....Windsor.
 Gibson, James..... “
 Girdlestone, G. W..... “
 Goble, Frederick.....Harrow P.O., Colchester.

Hirons, W. B.....Windsor.
 Horne, Charles R..... “

Jenking, HenryWindsor.
 Jones, ThomasWindsor.
 Johnson, David “

Kennedy, HenryWindsor.

Langlois, JoelWindsor
 Leggatt, Gordon (Judge) “
 Lusthead, Stephen..... “

Macdonnell, S. S.Windsor.
 Meloche, F. X. “

Morgan, J. H. (Rosebank) Amherstberg.
 McGregor, David Windsor.
 McGregor, Robert..... "
 McGregor, William "
 McLaughlin, Peter..... "
 McWhinney, A. G..... "

O'Connor, Jerry Windsor.
 Offitt, Henry "

Patterson, J. C..... Windsor
 Paxton, G. B..... "
 Perkins, Thomas "
 Prest, Thomas "

Richards, Charles J. Windsor.
 Richards, Mark, Sen..... "
 Richardson, Johnson..... "
 Rolf, William..... "
 Rorrison, B. D. D..... "

Simkins, Henry Windsor.
 Sullivan, (Capt.) J. D.... "
 Sutton, T. C. "

Tregent, A. N..... Windsor.
 Treble, William "
 Thornburn, John "
 Turk, John, Jun..... "

Webster, James Windsor.
 Wright, Thomas H..... "
 Wright, Wm (Petite Cote) Sandwich.
 Wilkinson, James W..... "
 Whyte, Robert A. Windsor.

ELGIN.

Bishop, Luke St. Thomas.
 Boggs, William George... "
 Brown, Henry "

Cairns, Robert..... Copenhagen.
 Claris, George T..... St. Thomas.
 Cruise, J. E..... "
 Currie, James..... "

Dawling, L. Aylmar.

Eccles, Samuel St. Thomas.
 Ellis, Henry "

Farley, John St. Thomas.
 Ferguson, John Union.

Gustin, E. W..... St. Thomas.

Havens, William V. Aldborough.

Laing, Joseph..... St. Thomas.
 Latimer, (Rev.) J. F..... Port Stanley.

Morrison, Thomas..... Port Stanley.
 McKay, George "
 McKay, J..... St. Thomas.
 Nichol, Robert St. Thomas.

Peacock, Thomas Mount Salem.

Rea, John Port Stanley.
 Rowe, Peter..... St. Thomas.

Thornton, Henry St. Thomas.
 Turvill, Richard..... "

Witwam, Charles St. Thomas.
 Warren, Thomas D..... "

FRONTENAC.

Allen, J. A..... Kingston.

Baker, Thomas Kingston.
 Briggs, Thomas "
 Baden, Eli "
 Busch, John "
 Blythe, John "

Craig, Major Kingston.
 Cameron, Alexander..... "
 Cartwright, R. J. (M.P.) "
 Carruthers, John "
 Cooke, Daniel..... "

Dawson, Reuben Kingston.
 Day, Johnson..... "
 Day, Peter "
 Dickson, J. R. (Dr.) "
 Down, M..... "
 Duff, John "

Ferguson, Rev. G. D..... "
 Flannagan, M..... Kingston.
 Fraser, John "
 Fisher, James..... "
 Folger, Benjamin W..... "
 Fry, William (Millowen) "

George, F. J. Kingston.
 George, Charles "
 Gildersleeve, J. P..... "

Hamilton, Clarke Kingston.
 Hora, Francis H. "

Kent, Miss Kingston.
 Kent, B. "
 King, J. G..... "
 Kirkpatrick, G. A. (M.P.) "
 Kirkpatrick (Rev.) F. W. "

Livingston, A..... Kingston.
 Lyons, Charles "

Marshall, William Kingston.
 Morten, George "
 Muckleston, John "
 Mulkins, Rev. H. "
 McAwley, John "
 McCarthy, John..... "
 McCormick, A..... "
 McLeod, Neil..... "

McRae, W. R.....Kingston.

Nichols, DavidKingston.

Nichols, Joseph“

Nimmo, Mr.....“

O'Reilly, JamesKingston.

Robertson, George.....Kingston.

Stewart, John (M.D.)Kingston.

Simpson, Isaac“

Simpson, W. B.....“

Snodgrass, W. W., D.D. “

Wartman, H.Kingston.

Watts, Samuel N.....“

Wilkinson, G. M.....“

Williamson, Jas. (LLD.) “

Wilson, Thomas.....“

Wood, Samuel.....“

Yates, (Dr.) H.....Kingston.

GLENGARRY.

Dingwall, Alexander.....Lancaster.

Gilmore, CharlesFront, Lancaster.

McPherson, Daniel.....Front, Lancaster.

GRENVILLE.

Irwin, JamesPrescott.

Parker, Henry.....Merrickville.

GREY.

Badger, Aaron.....Ravenna.

Brown, RobertClarksburg.

Buchan, James.....Owen Sound.

Benwell, J. P.....Oxenden.

Cameron, A. (Dr.).....Owen Sound.

Clarke, GeorgeHeathcote.

Christie, DavidOwen Sound.

Cowe, William.....Mount Forest.

Cumming, Andrew.....Owen Sound.

Donaldson, Samuel.....Heathcote.

Douglas, JamesOwen Sound.

Edmonstone, JamesJohnson.

Francis, Jno. G.Owen Sound.

Flemming, Andrew.....Craigleith.

Gregory, A. J.....Mount Forest.

Grierson, JohnRavenna.

Hewgill, William.....Heathcote.

Irwin, JamesRavenna,

Luton, Alfred.....Woodford.

Marsh, W. J.Clarksburg.

Miller, J. S.....Owen Sound.

Moore, Benjamin.....Heathcote.

Mulholland (Rev.) R. H. Owen Sound.

McLean, John.....“

Parker, S. J.....Owen Sound.

Plowes, WilliamHepworth.

Roy, WilliamOwen Sound.

Spaul, AustinClarksburg.

Stevens, A. M.....Owen Sound.

Smith, R. J.....“

Snider, George (M.P.) .. “

Smith, Robert.....Durham.

Shore, AndrewThornbury.

Sumner, W. C.Owen Sound.

Taylor, Henry.....Owen Sound.

Taylor, Peter“

Todd, Edward“

Trotter, Richard.....“

White, WilliamClarksburg.

Wilson, David.....Owen Sound.

HALDIMAND.

Ackman, T. H.....Cayuga.

Blackeney, T.....Cayuga.

Baxter, J.....“

Bell, ChristopherMount Healy.

Campbell, E. C.....Cayuga.

Cotton, George S.....“

Decew, EdgertonCayuga.

Farrell, A. P.....Cayuga.

Ferguson, James.....“

Ferth, C.....Hagersville.

Hongsberger, D.....Rankin Centre.

Lindsay, JamesCayuga.

Martin, F. O.....Cayuga.

Martin, J. R.....“

Martin, E. S.“

Mitchell, James“

Montgomery, James G...Indiana.

Mussen, William.....“

McMurdo, John.....Stromness.

Stevens, D. F.....Cayuga.

Stevenson (Judge)“

Thompson, A. W.....Mount Healy.

Watson, M.....Cayuga.

Weir, R.York.

Young, Jacob Cayuga.

HALTON.

Anderson, John Hornby.

Barber, James Georgetown.

Brain, Edwin Hornby.

Balsdon, T. J. Port Nelson.

Bowbeer, James H. Trafalgar.

Butts, John Lowville.

Bussell, James Hornby.

Clement, M. Trafalgar.

Center, William Milton.

Chisholm, Thomas "

Cowan, John Hornby.

Durkee, S. M. Wellington Square.

Fee, William G. Esquesing.

Gastle, Thomas Lowville.

Hammond, D. Sheridan.

Hilton, Charles E. Oakville.

Horning, John E. Bronte.

Laird, William Hornby.

Lusk, C. H. (M. D.) Oakville.

Miller, Thomas Milton.

Morse, S. P. Lowville.

Murray, J. (Lieut. Col.) .. Esquesing.

McCallum, Findlay Milton.

McCraney, N. S. Bronte.

Nelson, Abram Ashgrove.

Russell, James M. Trafalgar.

Springer, O. S. Wellington Square.

Triller, P. P. Port Nelson.

Thornton Alfred. Ashgrove.

Wallbroke, Benjamin ...Omah.

Watson, Henry Milton.

Young, Thomas Georgetown.

Zimmerman, H. P. Zimmerman.

HASTINGS.

Bird, Ralph R. Foxboro.'

Boardman, Moses Halloway.

Burdell, Alexander Belleville.

Conner, James Halloway.

Graham, John Wallbridge.

Glass, James Belleville.

Simpson, J. H. Belleville.

Wood, William Wallbride.

HURON.

Adamson, Peter Goderich.

Alison, John Exeter.

Alison, Joseph Clinton.

Biggins, W. J. Clinton.

Bingham, E. Goderich.

Clark, Colin Goderich.

Cameron, M. C. "

Crabb, Christopher "

Cattle, George "

Cresswell, Edwin Egmondville.

Cresswell, W. N. Seaforth.

Clifford, Edwin Goderich.

Cottel, John Farquhar.

Cooper, Thomas Clinton.

Cooke, John Dungannon.

Dickinson, Archibald. Goderich.

Dickinson, James "

Farrin, W. Clinton.

Ferguson, D. Goderich.

Fisher, A. S. Clinton.

Gibbons, Robert. Goderich.

Goderich Horticultural

Society "

Gordon, Robert "

Guildress, J. "

Hale, Horatio Clinton.

Haydon, William Port Albert.

Hood, Thomas Goderich.

Hodge, D. B. "

Horton, Henry "

Horton, Horace "

Hosker, E. "

Hunter, John "

Jackson, T. G. Wingham.

Joslin, John Clinton.

Jordan, Francis Goderich.

Lansborough, Robert ...Clinton.

Lough, Matthew "

Miller, J. R. Goderich.

Moorehouse, Theodore J. "

Moseley, John "

Murdock, John "

Murray (Capt.) W. F. Clinton.

Murray, Andrew Goderich.

McDougle, P. A. (M.D.) "

McMicking, G. M. (M.D.) "

Plews, Robert Clinton.

Polley, A. M. Goderich.

Rattenbury, Isaac Clinton.

Ridout, Charles "

Ridout, John "

Ross, A. M. Goderich.
 Robinson, Peter "
 Searles, W. C. Clinton.
 Small, James Goderich.
 Slack, C. E. "
 Saunders, James "
 Stewart, John Ben Miller.
 Stewart, John Goderich.
 Stewart, James "
 Sinclair, J. S. "
 Shipley, William Clinton.
 Smith, John "
 Smith, James "
 Smith, Abraham Goderich.
 Squire, W. R. "
 Stonehouse, Alfred Bayfield.

Thwaite, Richard Clinton.
 Thompson, John Seaforth.
 Thompson, James Goderich.

Walters, Francis Clinton.
 Watson, Alexander Goderich.
 Wells, Thomas "
 Wetherald, Thomas "
 Widder, Charles "
 Williams, J. H. "
 Wilkinson, James "

KENT.

Arnold, S. Chatham.

Baxter, Thomas H. Chatham.
 Baxter, James "
 Baxter, John "
 Berry, William "
 Brookman, Rev. Morpeth.

Donovan, James Chatham.
 Dolsen, Alexander "
 Dunlop, Robert "
 Duncan, Alexander Bothwell.

Francis, W. P. Chatham.
 Fisher, Robert S. "
 Foote, George W. "

Grey, William Chatham.

Irwin, William Chatham.

McKellar, Peter Chatham.
 McKerrell, P. E. "
 McKeough, John "
 McKeough, William "

O'Hara "

Patterson, H. A. Morpeth.
 Pegley (Dr.) Chatham.

Rannie, John (Revd.) ... Chatham.
 Rolls, Edwin C. "
 Ross, W. McKenzie "
 Robinson, O. "

Rose, C. H. Chatham.

Scane, E. W. Chatham.
 Scribner, G. W. "

Taylor, Thomas Chatham.
 Tizziman, John "
 Tyhurst, E. Ridgetown.

Van Allen, D. R. Chatham.
 Van Horn, J. "

Wall, John Chatham.
 Williams, D. A. "
 Willson, David "

LANARK.

McNabb, Colin Smith Falls.

LENNOX.

Pringle, Allen Selby.

LINCOLN.

Alcock, Robert Smithville.

Ball, J. W. Niagara.
 Ball, R. N. "
 Blair, John St. Catharines.
 Beadle, D. W. "
 Bridgeman, Henry W. Smithville.
 Bridgeman, Milton "
 Bridgeman, W. B. "
 Buchanan, Thomas St. Catharines.
 Brewer, Mrs. Elizabeth ... St. Ann's.
 Buckbee, Mrs. Mary Smithville.
 Bullivant, J. St. Catharines.

Calder, Ira F. Grimsby.
 Campbell (Revd.) Chas. ... Niagara.
 Cline, George W. Grimsby.
 Cole, A. St. Catharines.
 Cobb, R. N. Smithville.
 Cross (Dr.) L. St. Catharines.
 Comfort, J. H. (M.D.) ... "
 Cruickshank, Mrs. Smithville.

Dalton, Michael Smithville.
 Davis, Elias "
 Doran, James Grimsby.
 Dockstader, Mrs. Catharine Attercliffe.
 Durand, A. Niagara.

Feeter, Henry Smithville.
 Field, James "
 Field, Nathan "

Graham, William (Col.) ... Niagara.
 Graydon, Thomas St. Catharines.

Hopkins, J. B. Smithville.

Keating, James W. Jordan.

Keating, M. Y.....Jordan.
 Kemp, Robert.....Beamsville.
 Kerr, J. C. " "
 Keys, Thomas.....St. Catharines.
 Kilborn, J. C.Beamsville.

Lindeberry, SilasBeamsville.
 Lounsbury, John W....Smithville.
 Lowry, David L.....St. Davids.
 Lutz, David.....St. Catharines.

Merritt, IsaacSmithville.
 Merritt, Thos. R. (M.P.)..St. Catharines.
 Merritt, W. B.Smithville.
 Middleton, J. T..... " "
 Miller, James A.....St. Catharines.
 Mills, J. jun..... " "
 Morse, A.....Smithville.
 Murray, Rev. John G...Grimsby.
 McArdle, E.....St. Catharines.
 McCalla, W. J..... " "
 McMurray, William, D.D.Niagara.

Nelles, J. W. G.....Grimsby.
 Nelles, B. R..... " "
 Nelson, A. S.....Smithville.
 Nixon, Allen.....Grimsby.

Osborne, J. B.....Beamsville.

Paffard, HenryNiagara.
 Paton, JamesBeamsville.
 Palmer, DennisGrimsby.
 Phelps, O. J.Meriton.
 Pettitt, A. H.Grimsby.
 Plumb, J. B.....Niagara.

Read, D.D.Grimsby.
 Read, W. H.....Port Dalhousie.
 Robertson, Donald.....Queenston.
 Russ, William.....Smithville.
 Rye, Miss MariaNiagara.
 Rykert, J. C. (M.P.P.) ..St. Catharines.

Shaw, Thomas.....St. Catharines.
 Shearer, Robert.....Niagara.
 Servos, Peter C..... " "
 Snyder, GeorgeSt. Anna.

Taylor, James.....St. Catharines.
 Ten Eyck, J. G.....Grimsby.
 Tufford, HenryBeamsville.

Van Duzer, Dennis.....Grimsby.
 Van Duzer, J. W..... " "

Walker, RobertSt. Catharines.
 Weam, AugustusSmithville.
 Wilcox, Israel..... " "
 Woodruff, H. C.....St. Davids.
 Wolverson, C. E.....Grimsby.
 Wolverson, Linus " "

LAMBTON.

Allan, SamuelSarnia.
 Allair, Adolphus..... " "

Adams, JoshuaSarnia.
 Alexander, D.....Corunna.
 Anderson, Samuel S....Wyoming.
 Anderson, William.....Sarnia.
 Armstrong, (Rev.) D....Moore.

Balster, John C.....Sarnia.
 Bartley, JohnWarwick.
 Barwise, ThomasBirkhall.
 Breckin, RichardOssian.
 Bellchamber, JamesSarnia.
 Boyle, Adam " "
 Brown, Robert J.....Birkhall.
 Bucke, Maurice (M.D.) ..Sarnia.
 Brunning, J. W..... " "
 Bulman, Thomas " "

Carr, JohnSarnia.
 Carr, Samuel " "
 Clarke, W. B..... " "
 Campbell, Robert P....Matlock.
 Crawford, JohnSarnia.
 Carrick, WilliamOban.
 Cleary, JohnPoint Edward.
 Creighton, Francis.....Moore.
 Christie, George.Point Edward.
 Copeland, JamesSarnia.
 Cole, William " "
 Cornell, StephenArkona.
 Cornell, Samuel H..... " "
 Cruikshank, JohnColinville.

Dalziel, JohnWidder Station.
 Dawson, S.....Sombra.
 Davidson, A.....Arkona.
 Davidson, RobertMatlock.
 Davis, (Col.) F.....Sarnia.
 Dickson, George.....Point Edward.
 Duncan, Charles S....Birkhall.

Eastman, C. M.....Arkona.
 Earl, GeorgePoint Edward.
 Ernst, Louis..... " "

Forbes, Alexander...Sarnia.
 Forbes, GeorgeKetch.
 Flory, Mrs.....Sarnia.

Grant, JohnBirkhall.
 Gould, Peter " "
 Gleeson, TimothySarnia.
 Godley, George..... " "
 Gurd, R. S..... " "

Hill, PeterPoint Edward.
 Hilliar, GeorgeSarnia.
 Hoskins, William " "
 Hossie, David.....Logierat.

Jarvis, Paul.....Ravenswood.
 Johnston, Alexander....Logierat.
 Johnstone, T. W. (M.D.)..Sarnia.
 Jones, Edward " "
 Jones, W. G.....Point Edward.
 Johnson, JohnBirkhall.

Kerr, Thomas.....Sarnia.

Lamb, WilliamArkona.

Leys, GeorgeSarnia.

Livingstone, Duncan.....“

Livingstone, AngusWyoming.

Livingstone, D.....Point Edward.

Lucas, George.....Sarnia.

Major, James.....Logierat.

Mannin, DavidBirkhall.

Marow, James.....Camlachie.

Martin, RichardWidder Station.

Mitchell, EdwardPoint Edward.

Mitchell William.....“

Morrison, DonaldCorunna.

Mudie, T. G.....Sarnia.

Murphy, JamesCamlachie.

McClain, James“

McCurk, HenryCorunna.

McDonald, JamesBirkhall.

McGlashan, CharlesCorunna.

McIntyre, James.....Point Edward.

McKenzie, John.....Birkhall.

McKenzie, John A.....Sarnia.

Mackenzie, John.....“

McKenzie, FindlayBirkhall.

Mackenzie, DanielSarnia.

McMaster, David“

McVicar, S. A.“

Nesbit, GeorgeBirkhall.

Nisbet, David.....Mandaumin.

Pardee, T. B. (M.P.P.)...Sarnia.

Payne, Joshua.....Corunna.

Pousette, A. C. (M.D.) ...Sarnia.

Robinson, JohnSarnia.

Rogers, James.....“

Russell, George“

Steed, RobertSarnia.

Stevenson, George.....“

Smith, AlexanderRavenswood.

Smith, George.....Arkona.

Smith, James A.....Sarnia.

Smith, Hugh“

Smith, WilliamWidder Station.

Stokes, WilliamMoretown.

Stovin, Cornelius.....Sarnia.

Taylor, James.....Corunna.

Taylor, JohnRavenswood.

Tyrnay, JamesMatlock.

Vidal, (Honble.) A.....Sarnia.

Vidal, T. G.....“

Watson, Alexander.....Moore.

Watson, EbenezerSarnia.

Watson, James.....Birkhall.

Wilson, William J.....“

Wheatley, T. C.....Sarnia.

Welch, ThomasWidder Station.

Welsh, JamesBirkhall.

Weiss, DavidLogierat.

Whillet, WilliamBirkhall.

Wood, J. H.....Sarnia.

Yeates, Robert.....Point Edward.

Young, ArchibaldSarnia.

LEEDS.

Abbott, AlfertBrockville.

Cook, Hiram.....“

Cowan A.....“

Dickinson F. G.....“

Jones Fredk.....“

Miller, R. J.....“

McNish, Charles.....“

Pennock P. (P. M.).....Elgin.

Reynolds, Samuel Jr. ..“

Scholfield, F.....“

MIDDLESEX.

Andrews, C. H.....London.

Abbott, Hodson G.....“

Baker, Charles.....“

Baker, J. C.“

Barker, William.....“

Baxter, H. A“

Beattie, John.....“

Begg, Adam.....“

Begg, L. G.....“

Benson, O. O.....“

Beddome, Y. B.....“

Beltz, E.....“

Brown, V. A.....“

Bruce, H.“

Burke, Major.....“

Bullen, W. T.....“

Cameron J.....“

Campbell, Duncan.....“

Cleghorn, Andrew....“

Colmorgan Frederick...“

Cooper, E. H.“

Cooper, E.....“

Collett E. S.....“

Complin, Charles.....“

Couch, W. R.....“

Cronyn, V.....“

Cronyn, Benjamin.....“

Denton, J. M.....“

Dyas, J. J.....“

Emmery, A. S.....“

Essery, Matthew.....“

Fayette, (Rev.) J. F. A. S. “

Ferguson, James.	London.	Stead, Charles.	London.
Finnemore, A.	"	Smyth, A. G.	"
Fitzgerald, W. W. Vinemount	"	Smyth, J. B.	"
Glass, David.	"	Taylor, Benjamin.	"
Gauld, Alexander.	"	Taylor, (Col.) J. B.	"
Grant, Peter.	"	Taylor, E. A.	"
Glen, James, Jr.	"	Taylor, James.	"
Griffiths, James.	"	Tibbs, J.	"
Griffiths, John H.	"	Wastie, Thomas.	"
Gould, Samuel.	"	Waddull, R.	"
Going, Henry.	"	Waldock, C. P.	"
Haystead, David.	"	West, Edward.	"
Hayes, William.	"	Williams, John (G. W. R).	"
Hyman, E. W.	"	William, John F.	"
Innis, (Rev.) Geo. M.	"	Williams, J. (Alderman).	"
James Wm.	"	Wood, Samuel.	"
Jeffray Joseph.	"	Woodruff, M. D.	"
Land, Edward.	"	Attwood A. C.	Vanneck.
Landor, Henry.	"	Agnew, N.	Delaware.
Landcaster, (Dr.) J. J.	"	Anderson, C. J.	Mt. Bridges.
Leys, Major.	"	Barber S. P.	Mount Bridges.
Matthewson, H.	"	Bice, Artemus.	McGillivray.
Mellar, R.	"	Bishop, Luke.	St. Thomas.
Monchief, W. G.	"	Boggs, Wm. Geo.	"
Morden J. P. (M.D).	"	Brown, Henry.	"
Morris, William.	"	Bullery, George.	Strathroy.
Moyes, William.	"	Burrage W. S.	Ailsa Craig.
Mountjoy A.	"	Cairns Robert.	Copenhagen.
Moore, W. M.	"	Claris George F.	St. Thomas.
McBride, Alexander.	"	Coy, Richard.	Strathroy.
McClaney, John.	"	Cruise J. E.	St. Thomas.
McColl, A. B.	"	Currie, James.	"
McCormick, Thomas.	"	Ewer W. H.	Strathroy.
McDonald, Donald.	"	Eccles, Samuel.	St. Thomas.
Macfie, D.	"	Ellis, Henry.	"
McIntosh, Alexander.	"	Francis A. (MD).	Delaware.
Mackenzie, Philip.	"	Frias, Charles.	Ireland.
McLeod, Thomas.	"	Fox, C. J.	Delaware.
McMechan, John.	"	Gammage, James.	Hyde Park.
McMechan, J. H.	"	Gustin E. W.	St. Thomas.
McMullen, Thomas F.	"	Hamilton, G. G.	Ailsa Craig.
Nattrass J.	"	Havens William V.	Aldborough.
Pearson, Thomas.	"	Jones, Francis.	Ireland.
Peters, Samuel.	"	Laing, Joseph.	St. Thomas.
Priddis Charles.	"	Morrison, Thomas.	Port Stanley.
Pope, James.	"	McIntyre, John.	Appin.
Poole, Samuel.	"	McKay, George.	Port Stanley.
Plummer, John.	"	McKay J.	St. Thomas.
Read, Reuben.	"	McLean, Robert.	Lucan.
Reed, E. B.	"	Newbigging, John.	Strathburn.
Ritchie, Robert.	"	Nichol, Robert.	St. Thomas.
Robinson, George.	"	Peacock, Thomas.	Mt. Salem.
Rowland, Frederick.	"	Perry, William.	Granton.
Saunders, S.	"		
Saunders, William.	"		
Strathy J. B.	"		
Stephens, Richard.	"		

Rea, John.....Port Stanley.
 Richardson, William.....Strathroy.
 Rowe, Peter.....St. Thomas.
 Rosser, John.....Denfield.

Seabrooke, Sidney.....Delaware.
 Shoff D.....McGillivray.
 Sugden Robert.....Thornhill.
 Sutherland, William.....Glencoe.

Thornton, Henry.....St. Thomas.
 Turville, Richard.....“

Vail, Aaron.....Delwaare.

Ward, George G.....Wardsville.
 Warren, Thomas D.....St. Thomas.
 Witnam, Charles.....“

NORFOLK.

Brady, D. C.....Houghton Centre,
 Barthe, De La, H. D. Beaumont. Port Dover.

Clarke, Thomas M.D.....Simcoe.

Jackson, John.....“

McInnes, W. S. (M.D).. Vittoria.

Ryersee, Edward H.....Port Dover.

NORTHUMBERLAND.

Burnham, A. A. Jr.....Cobourg.

Clarke, Geo. M.....Cobourg.
 Clarke, John.....Barnbrae.
 Cook, William.....Cobourg.
 Denmark, M.....Campbellford.

Findlay, Jas. A.....Gore's Landing.
 Fuller J. R.....Colborne.

Johnson J. W.....Campbellford.

Massie, John.....Colborne.
 McGregor, Charles.....Colborne.

Scott, R. B.....Colborne.

Turney, Levi.....Colborne.

OXFORD.

Adams, Richard.....Woodstock.

Golding, Henry (Life Member). Thamesford.

Hall, J. B.....Woodstock.

McAllan, W.....“

Newton, A.....“
 Newton, John.....“

Parker, T. H.....“

Parr, G.....Woodstock.

Stranchan, George.... “

Taylor, Charles.....Culloden.

White, Richard.....Woodstock.

ONTARIO.

Annis, Andrew.....Oshawa.
 Arsksey, Thomas.....Brooklin.

Bartlett, John.....Oshawa.
 Beall, Samuel.....Columbus.
 Beall, William.....“
 Bowman, T. W.....Oshawa.
 Burnham, Thomas....Brooklin.

Chase, James.....Oshawa,
 Cochrane, S. H.....Whitby,
 Cookwell, Barnet.....“
 Connant, Thomas.....Oshawa.
 Corbett, James.....“

Draper, James.....Whitby.
 Dearbarn, Edward....Oshawa.
 Dearbarn, Samuel Jr... “
 Dick, Joseph.....“
 Dryden, John.....Brooklin.

Farewell, A. (M. P. P)....Oshawa.
 French, Isaac.....“
 Fox, J. C.....Foley.
 Fuller, S.....Whitby.

Glen, F. W.....Oshawa.
 Greenwood, John H....Whitby.
 Gibbs, S. N. (M. P.)Oshawa.
 Gibbs W. H.....“
 Guy, James C.“
 Guy, Thomas.....“

Hall, Luther.....Oshawa.

Johnson, Myram.....Oshawa.

Lewis, George.....Oshawa.
 Lick, Daniel.....“
 Lockhart, K. F.....Whitby.

Martin, W. C.....Oshawa.
 Muir, William.....Dumbarton.
 McAvoy, Charles.....Kinsale.
 McGill, John.....Oshawa.

Payne, Charles.....Manchester.
 Perry J. H.....Whitby.
 Piles, James.....Ashburn.
 Pitt, Henry.....Whitby.
 Post, Walter.....Pickering.

Rae, Francis (M.D)....Oshawa.
 Reynolds, N. G.....Whitby.

Slade, D. D.....Oshawa,
 Sheir, John.....Whitby.

Sheer, William.....Beaverton.
Strickling, John.....Oshawa.

Thwaite, M.....Whitby.
Trevin, Samuel.....Oshawa.
Trigg, Thomas.....“
Toms, Samuel.....“
Thornton, Patrick.....“

White, John.....Oshawa.
White, William.....Whitby.
Wilson, Joseph.....Whitevale.
Wilson, Seth C.....Whitby.
Wilcox, J. S. M.....“
Whiting, A. S.Oshawa.

Yarnold, B.....Whitby.

PEEL.

Alderson, James.....Summerville.
Allen, James B.....Malton.
Aikin, M. H. (M.D.)...Burnamthorpe.

Bell, Wm.....Caledon.
Brocklebank, T.....Malton.
Burgess, John.....Richview.

Carke J. P.....Brampton.
Carr, William.....Burnamthorpe.
Craig, Allen.....“
Craig, Robert.....“
Cochrane, R.....Brampton.
Coyne, John.....“
Cook, James.....“

Divell William.....Burnamthorpe.
Dyer, Henry.....Edmonton.

Foster, Joseph.....Malton.

Garbutt, George.....Richview,
Graham, George.....Brampton.
Green, George.....“
Golden, Joseph.....Derry West.

Haggart, John.....Brampton.
Hammond, O.....Credit.
Hickley, James.....Summerville.

Ibson, Richard.....Malton.

Johnstone, Francis.....Malton.
Jordon, Jeremiaah.....Burnamthorpe.

Knaggs, Wm.....Richview.
King, Henry.....Burnamthorpe.

Lently, Henry.....Burnamthorpe.

McCourt, Hugh.....Malton.
McKay, William.....Richview.

Orth, Jonathan.....Summerville.

Patullo, A. (M.D.).....Brampton.
Palette, Robert.....Summerville.

Ramage, Thomas.....Richview.

Shaver, W. T.....Summerville.
Shaver, Francis.....“
Shaw, James.....Malton.
Savage, George.....Burnamthorpe.
Scott, James.....Brampton.
Scott, A. F.....“

Tomlison, D.....Malton.

Watson, John.....Summerville.
Wilcox, Allen.....“
White, Solomon.....Cooksville.

PETERBOROUGH.

McClennanPeterboro'.

Nichols, W. W.....North Douro.

PERTH.

Baynes, John.....St. Mary's.
Bradley, Wm.....“
Bertch, T.....“

Calley, E. M.....St. Mary's.

Dutton, John.....Stratford.

Ellison, George S.....“
Elliot, William.....St. Mary's.

Griffin R. W.....St. Mary's.

Hamilton, Thomas D...St. Mary's.
Hutton, W. N.“

Jones, Charles.....“

Lawrence, G. W.....Stratford.
Legge, John.....St. Mary's.

Mitchell J. G.....“
Mitchell S. H.....“
Morrison, Peter.....Molesworth.
Mountain, W.....St. Mary's.
Mitchell J. G.....“
McDougall Alf.....“

Pickard, James.....“

Riddle, William.....“

Stephens, Allen.....“
Service, R. S. (Lieut. Col)Stratford.
Smithwick P. T.....“

Thompson, John .. .St. Mary's.

Wardler George.....Stratford.
Whelihan, P.....St. Mary's.
Weir, William.....“
Wilson, Joseph.....“

DUNDAS.

No members.

STORMONT.

No members.

PRESCOTT.

No members.

RUSSELL.

No members.

RENFREW.

Russell, Andrew.....Arnprior.

SIMCOE.

Bligh A.....Collingwood.
 Bourne, Daniel.....Barrie.

Cameron, Charles.....Collingwood.
 Creelman, James R....."
 Cowan, George....."

Driffield Thomas.....Bradford.
 Dudgeon, A.....Collingwood.

Gammon Charles....."

Hilborn, N....."

Jarvis, William.....Bradford.
 Johnston, Joseph (Vespra).Craighurst.

Lett, (Rev. Dr.).....Collingwood.
 Lloyd, T. D.....Barrie.
 Long, Thomas.....Collingwood.

Moberley, George....."
 McCraw, Robert.....Craigvale.
 Maconchy, Thomas.....Gilford.

O'Brien, E. G.....Shanty Bay.
 Ottawa, George.....Barrie.

Parlane, W. A.....Collingwood.

Ross, John.....Allendale.

Scanlan, Mark.....Bradford.
 Stephens Alexander R.....Collingwood.
 Stevenson, John.....Bradford.
 Sneath, George.....Midhurst.
 Smith, B. W. (Sheriff)...Barrie,

Vair, William.....Barrie.

VICTORIA.

Baker, C. L.....Lindsay.
 Beall, Thomas....."

Cooper, Edwin.....Port Carling.
 Cooper, Joseph.....Lindsay.

Deacon, (Capt).....Lindsay.

Ellis, James....."

Grace, William....."

Gregory, Edward....."

Gregory, George....."

Heap, James....."

Jones, Frederick....."

Knowlson, John....."

Lack, Daniel....."

Lyons, John....."

Matchell, Thomas....."

McBirney, William....."

McDonnell, William....."

McDougall, (Sheriff)....."

McLaughlin, A.....Norland.

McLennon John.....Lindsay.

Neads, Charles....."

Robson, W. M....."

Sanderson, George....."

Storey, Mr....."

Stoneman, Charles.....Rosseau, Muskoka.

Tyrell, J.....Lindsay.

Watson, James....."

Welstead Charles....."

Williams, Thomas....."

Wright, Alfred....."

Wood, J. C....."

Woodman, J. H....."

WELLAND.

Angerstein, George...Humberstone.

Angerstein, Elias....."

Bartlett Rev. T. H. M...Drummondville.

Bell, (Rev.) Geo.....Clifton.

Bender, Hiram....."

Bigger, Haggai....."

Cameron, (Rev.) J. Y....Drummondville.

Carwin W. S....."

Chrysler, H.....Clifton.

Duncan, George.....Drummondville.

Duncan, George J....."

Eden, William.....Fort Erie.

Fares, G. W.....Port Colbourne.

Graham, Richard.....Fort Erie.

Graham, John....."

Hale, Horatio.....Clinton.

Hawse, John.....Thorold.

Henderson, George.....Clifton.
 Henderson, (Miss) M.A. "
 Howell, Morris.....Drummondville.

Ingles, (Rev.) C. L..... "

Knisely, O. F.....Humberstone.

Lampman, Frederick.....Thorold.
 Lawson, Mitchell.....Clifton.
 Lewis, Z. B....."
 Lundy, L. S.....Drummondville.
 Lundy, William....."

Murray, Mrs. (General)... "
 McGill, John.....Thorold.
 McKay William.....Drummondville.
 McLeod, Rev D. J. T..Chippewa.

Neff, Jonas.....Port Colborne.
 Neff, Jonathan.....Humberstone.

Quinn, Rev. J. C.....Thorold.

Rainsford Wm.....Fort Erie.
 Ross, Alderson.....Clifton.
 Roy, Wm. "

Stevenson, John.....Drummondville.
 Street, Thomas C.....Chippewa.
 Smeaton, John.....Clifton.
 Sloan, W. M.....Point Abino.
 Stoner, L. H.....Humberstone.

Tench Wm. E.....Drummondville.
 Thompson, William.....Fort Erie.
 Tuft, Wallace.....Welland.

Waterson, James.....Drummondville.

WATERLOO.

Allen, Daniel.....Galt.
 Aldous, J.....Berlin.
 Anthur, J. S....."

Blain, James.....Galt.
 Bauman, Abraham...Preston.
 Boulty, D. J.....Berlin.
 Boomer, M. Dr.....Galt.
 Buckner, Henry.....Berlin.

Caldwell, D.....Galt.
 Clark, Thomas....."
 Cochrane, William.....Roseville.

Davidson, Sheriff.....Berlin.
 Debuss, Geo. M....."

Farquarson, Daniel.....Galt.
 Flanning, John....."
 Femell, J.....Berlin.
 Fox, August....."

Galt, Jardine.....Galt.
 Geddes, C. R.....Berlin.
 Gotlieb, Frederick....."

Goldie, John.....Ayr.
 Goodall, A. J....."

Hoffman Isaac.....Berlin.
 Howard, George....."

Jackson, Henry F....."

Krantz, Hugo....."
 Ker, Adam.....Galt.

Lake, Henry.....Berlin.
 Lee, John.....Galt.

Meyar, Frederick.....Bridgeport.
 Moor, W. R.....Berlin.
 McGregor, Alexander...Galt
 McLean, Robert....."
 McLean, Robert....."
 McMillan, Thomas....."
 McMachon, Richard.....Berlin.

Oleslager, William....."

Patterson, George.....Galt.

Roy, Simon.....Berlin.

Shantz, J. V....."
 Shantz, Samuel Y....."
 Sheard, Titus.....New Aberdeen.
 Simons, Thomas M.....Galt.
 Simpson, Martin, Sr.....Berlin.
 Shoemaker, A. C....."
 Scholfield, M. C....."
 Susand, William A....."

Tassie, Wm.....Waterloo.

Warnock, A.....Galt.
 Wells, John....."

Younie, James.....Galt.

WELLINGTON.

Anderson, James.....Guelph.
 Alexander, William....."

Benham, William....."

Caldwell, John.....Alma.

Day, Ebenezer L.....Elora.
 Davidson, Charles (Town Hall Bdg.) Guelph.

Elliot, George....."

Frankland F.....Goldstone.
 Forbes, Robert.....Guelph.

Glass, Alexander....."
 Goldie, James....."
 Godfrey, John.....Elora.

Murton, George.....Guelph.
 McCrae, Thomas....."

McColl, James..... “
 McDonald, (Judge)..... “
 Sharpe, Charles..... “
 Sanders, W. S..... “
 Stevenson, William..... “
 Stone, Frederick William..... “
 Scott, Charles..... Elora.
 Scott, Charles..... Orangeville.
 Sorby, Douglas..... Guelph.
 Sturbridge, William..... Goldstone.
 Torrence, Rev. Robert.. Guelph.
 Topham, Robert..... Elora.
 Waddell, John..... “
 Whale, Thomas..... Goldstone.
 Waind, William..... “

WENTWORTH.

HAMILTON.

Allen, Thomas (G. W. R) Hamilton.
 Acland, William..... “
 Ames, Jonathan..... “
 Anderson, J. “
 Archibald, Robert..... “
 Black, Wm..... “
 Ball, G. A..... “
 Balfour, Peter..... “
 Barnard, James F..... “
 Bates, Philo D..... “
 Bagwell, J. B..... “
 Bauer, H..... “
 Baine, J. W..... “
 Barnes, George (Standard) “
 Baines, James..... “
 Bell, Matthew, 57 Willow St. “
 Beasley, Thomas (City Clerk). “
 Brierley, Richard..... “
 Bickle, J. W..... “
 Bickle, T..... “
 Bigelow, Alfred..... “
 Billings, John..... “
 Brown, John. (Wellington St). “
 Broadfield, Geo..... “
 Bruce, John A..... “
 Ball, Richard..... “
 Burnett, (Rev) Robert... “
 Burns F. W. (G. W. R.) “
 Burnes, Samuel..... “
 Burns, James..... “
 Bruce, F. C..... “
 Craigie, James..... “
 Craigie, William..... “
 Cahill, James..... “
 Campbell, James. (West Avenue St.)
 Campbell, R. S..... “
 Cranfield R. E..... “
 Carroll, Peter..... “
 Chidman, J. E..... “
 Chittenden C. S..... “
 Chisholm, D. B..... “
 Crisp, Alfred..... “
 Colbeck, H..... “

Copp, Anthony..... Hamilton.
 Copp, William..... “
 Crooks, Richard, (G. W. R.) “
 Coburn, H. P..... “
 Davis, J. H..... “
 Dawson, Donald..... “
 Dayfoot, P. W..... “
 Deck, Andrew, (G. W. R.) “
 Demmett, B. “
 Dingle, William..... “
 Dingwall, James M. (97 Napier St.)
 Dixon, W. (John St.)... “
 Duff, W. N. H..... “
 Eager, H. A. (Maiden Lane) “
 Edgar, Wm..... “
 Evans, Robert... “
 Eastwood, John..... “
 Esson, Allen..... “
 Franks, James..... “
 Fearman, T. W..... “
 Featherstone, Ralph..... “
 Feeley, C..... “
 Freed, John..... “
 Field, John..... “
 Finch W. H..... “
 Fitzpatrick, Martin..... “
 Foster Charles..... “
 Gage, Robert R..... “
 Galbraith D. B..... “
 Graham, John..... “
 Grant, Peter..... “
 Garrett John..... “
 Glassco, W. H..... “
 Gray, Henry (G. W. R). “
 Greenfield, James..... “
 Greenfield, Joseph..... “
 Greenhill, Andrew..... “
 Greening, B..... “
 Gillespie, George H. (Bleak House.)
 Goering, John..... “
 Guthrie, Thomas (Rebecca St).
 Hall, Thomas, 291 York St. “
 Harper, Thomas..... “
 Harvey, A..... “
 Hardy, Charles..... “
 Haskins, William..... “
 Hebden, (Rev) John..... “
 Henderson, Thomas..... “
 Henderson, J. M..... “
 Hendrie, William..... “
 Henwood, (Dr.) Henry... “
 Herron, Joseph 82 King St.. “
 Hess, Jacob R..... “
 Hornby, Joseph..... “
 Hopkins, Robert..... “
 Howard, C..... “
 Holton, W..... “
 Hornby, Wm. (G. W. R.) “
 Hunter, William (9 Wellington St).
 Hutchison, James..... “
 Hurd, W. H..... “

Isett, Thomas MHamilton.

James, George..... “
 James, J. W..... “
 Jameson, Alexander..... “
 Jardine, George..... “
 Jeffrey, Joseph..... “
 Jolly, J..... “
 Jones, C. T..... “

Kennedy, Reginald..... “
 Kneeshaw, Joseph..... “
 Kilgour, J..... “
 King, Stephen..... “
 Kilvert, F. E..... “

Law, R. N..... “
 Lee, Charles..... “
 Lees, Thomas..... “
 Lind, George..... “
 Lister, Claudia, 82 King St. “
 Lister, Joseph..... “
 Logie, Judge..... “
 Lottridge, William M... “
 Luxton, George..... “

Magill, Charles (M.P.).. “
 Mahoney, John C..... “
 Marlett S. D..... “
 Martin, E..... “
 Martin, Edward..... “
 Martin, George..... “
 Matthews, George..... “
 Metcalf, J..... “
 Meston, Charles..... “
 Mills, George H..... “
 Mills, W. H..... “
 Mills, James..... “
 Milne, William..... “
 Mitchell, Thomas..... “
 Moodie, John..... “
 Moore, Dennis..... “
 Morgan, B. J..... “
 Morgan, Robert..... “
 Morton, D..... “
 Morris, John..... “
 Munro, James..... “
 Murray, D..... “
 Murry, Peter (Athol Bank). “
 Murry, William..... “
 Murry, A..... “
 Myles, Thomas..... “
 Macallum, A. (M.A.)... “
 Maclean W. F. (Times office) “
 McClure, James (G. W. R.) “
 McClure, Robert..... “
 McKibbin, William (G. W. R.) “
 McKenzie, Thomas H... “
 McLaren, Henry..... “
 McNab, D. A..... “
 McQuesten, Calvin..... “

O’Heir, Peter..... “

Patterson John (Hess St.) “
 Pringle J. D..... “
 Proudfoot, W..... “

Quimby, A. C.....Hamilton.

Rankine, William (G. W. R.) “
 Reid, James (King St.) “
 Rice, (Rev.) D..... “
 Rioch, George..... “
 Robertson, James..... “
 Robertson, Charles..... “
 Roberts, D. E..... “
 Roseburgh, J. W..... “
 Roy, Robert..... “
 Rome, Richard..... “
 Rutherford, George..... “

Sadlier C. S..... “
 Shaw, James..... “
 Sanford, W. E..... “
 Sherrier J. P..... “
 Sewell, H. W..... “
 Stevenson, James (241 York St.) “
 Stewart, Alexander..... “
 Stewart, William (G. W. R.) “
 Stewart, Mr. (Times Office) “
 Strickland, William (Emerald St.) “
 Sinclair, William..... “
 Springer, Louis..... “
 Smith, Donald..... “
 Smith, Charles (G. W. R.) “
 Skinner, A. F..... “
 Sommerville, J. H..... “
 Spohn, J. W (Standard) “
 Stuart, / exander..... “
 Stuart, Robert..... “
 Sutherland, A.. .. “

Tarbox, J. N..... “
 Taylor, A. W..... “
 Taylor, W. T. (Wood Dept. G. W. R.) “
 Tindall, Thomas..... “
 Thomas, Charles L..... “
 Townsend, E. J..... “
 Turnbull, William..... “

Vannarman, A. E..... “
 Vernon, E. (M.D.)..... “

Waddell, R. R. (Standard) “
 Walker, Thomas..... “
 Watkins, Thomas C..... “
 Ware, E. W. (9 Vine St.) “
 Watson, James..... “
 Webber, J. M..... “
 Weatherstone John..... “
 Williams, M..... “
 Williams, J. M. (M.P.P.) “
 Wood, Andrew T..... “
 Woodley, Samuel..... “

Young, R..... “

WENTWORTH.

Allen, James.....Dundas.
 Anderson, George.....Aldershot.
 Baker, Ronald.....Dundas.
 Barrie, Alexander..... “

Bastable, Walter.....Dundas.
 Barnes, Philander....."
 Bain, Thos.....Strabane.
 Blair, John.....Dundas.
 Bennett, Alfred....."
 Bertram, John....."
 Bigger, J. H.....Winona.
 Boulthbee, W.....Copetown.
 Brooking W. H.....Dundas.
 Brown, Thomas.....Ancaster.

 Chambers William.....Winona.
 Cradock, R. H.....Dundas.
 Cartwright, (Rev.) T. S. Ancaster.
 Carpenter, A. E.....Stony Creek.
 Carpenter, C. P.....Winona.
 Carpenter, T. M.....Stony Creek.
 Clement, F.....Lynden.
 Cornell, D.....West Flamboro'.
 Cornell, J.....Lynden.
 Cooley, P.....Sheffield.

 Dickinson, Edward.....N. Glandford.
 Dodd, Adam.....Copetown.
 Douglas, Robert J.....Dundas.

 English, E. L.....Waterdown.

 Farmer, Geo. D.....Ancaster.
 Fee, A. H.....Stony Creek.
 Finton, Elijah....."

 Gard, R. S.....Ancaster.
 Graham, Andrew.....Dundas.
 Greening, Timothy....."
 Gordon, P. E....."

 Hammill, R. E.....Ancaster.
 Hatt, Thomas.....Dundas.
 Heslop, John.....Ancaster.
 Heslop, James.....Dundas.
 Hess, Jacob.....Ryckman Corners.
 Head, Thomas.....Copetown.
 Howard, Henry.....Lynden.
 Hopkins, J. W.....Stony Creek,
 Hubbard, H. J.....Ancaster.
 Hunter, Andrew.....West Flamboro'.
 Hurrell, John.....Dundas.

 Inksetter, Robert.....Copetown.
 Ireland, John....."
 Inglehart, James H.....Winona.

 Jones, A. G.....Stony Creek.

 Keagy, W. H.....Dundas.
 Keivell, John.....Greensville.
 Keivell, Thomas.....Lynden.
 Kitchen, W.....Copetown.

 Lahey, Thomas.....Dundas.
 Lewis, Levi.....Winona.

 Manning, George.....Dundas.
 Mercer, James....."
 Milne, Thomas.....Copetown.
 Morden, E. R.....West Flamboro'.

Morden, Jonathan.....Greensville.
 Morden, Peter.....Dundas.
 McCulloch, Gilbert....."
 McFarlane, D....."
 McKenzie, T. H....."
 McLean, E.....Lynden.
 McMillan, A.....Dundas.

 Nesbett, Adam.....Lynden.
 Nottle, J. T.....Binbrook.

 Orton, Henry (M.D.).....Ancaster.
 Overfield, Charles E.....Dundas.

 Patterson, P. L.....Lynden.
 Pettitt, Mussy.....Winona.
 Purdy, Thomas.....Westover.

 Ramey, Abraham.....Lynden.
 Randall, T. Stewart.....Stony Creek.
 Russell, Samuel.....Dundas.
 Russell, William....."

 Shaver, Edgar.....Ancaster.
 Staunton, F. H. L.....Dundas.
 Sexton, William (M.P.P.) Jerseyville.
 Smith, Allen.....Ancaster.
 Smith, D.....N. Glandford.
 Smith, Samuel....."

 Thurreson, Eyre.....Ancaster.
 Turnbull, James.....Dundas.

 Van Seckle, Lemuel.....Jerseyville.
 Van Seckle, Abram M....."
 Van Wagner P. S.....Stony Creek.

 Wilson, Richard.....Dundas.
 Wilson, Thomas....."
 Whitcombe, Charles E.....Ancaster.
 Wright, John.....Dundas.
 Wood, Robert....."

YORK.

Armstrong, P.....Yorkville.
 Awde, William.....Brockton.

 Baker, George.....Doncaster
 Bales, John.....Eglinton.
 Bastedo, J. A.....Newmarket.
 Brownlie, Thomas.....Danforth.
 Bull, John J. E.....Weston.
 Byer, (Hon.) J. H.....Milnesville.
 Byer, David....."

 Clark, Francis.....Lansing.
 Clark, Thomas....."
 Crosby, David A.....Markham.
 Cudmore, John.....Doncaster.

 Dixon, John.....Weston.

 Ferrier, John C.....Islington.
 Ferrier, Robert....."
 Forfar, Thomas.....Agincourt.

Hargrave, JosephEglinton.
Hamilton, JohnDoncaster.
Hartman, SHumber.

Johnston, Benjamin.....Islington.

Leslie, George, Jr.Leslie.
Lillies, David.....Elora.
Lillies, John“

Martin, Thomas M.Yorkville.
Miller, Joseph.....Lansing.
Montgomery, William...Islington.
Moor, James.....“

McBride, P.S.Islington.

Norris, W. H.Wexford.

Reesor, (Hon.) D.Markham.

Shaver, Charles.....Islington.
Streight, DavidIslington.
Skinner, ColinDavisville.

Thompson, W. AIslington.

Ward, JohnIslington.
Whiteside, John.....Ellesmore.
Woods, SamuelEtobicoke.
Woods, SamuelIslington.

TORONTO.

Authors, James.....Toronto.
Armstrong, Robert.....“

Beale, Charles J.....“
Brown, Charles J.....“
Brown, John.....“
Brown, W. A.....“
Brown, Richard.....“
Brown, Philip.....“
Boulton, W. H.“
Buckland, Geo. (Professor) “

Campbell, James.....“
Clarke, H. J.....“
Cassels, W. G“
Cayley, Hon. W.....“
Colwell, W.....“

Dalton, R. G.....“
Dack, Edward“
Davidson, Alexander..“
Doel, W. H.....“

Fraser, James.....“
Fleming, James.....“
Forsyth, John.....“

Gardner, Charles E.“
Gray, John(Brockton Nurseries near Toronto.)
Gibson, J.....“
Goldsmith, W. T.....Toronto

Heward, J. O.....“
Haldan, B.....“

Jamieson, Wm. M.....“
Jarvis, Edgar J.....“
Johnson, Neill.....“

Langmuir, M. (15 St. Vincent St. Box 1048)
Toronto.

Leslie, James (Box 57) “

Mason, J. H.....“
Miller, John J. R. (74 Front St.)“
Morphy, Geo.....“
Morphy, H. B.....“
Morton, B. (Sherbourne St.) “

McKirdy, James.....“
McPherson, (Hon.) D. L “

Parker, Sir Henry“
Pellatt, H.....“
Patterson, John“
Patterson, Peter“
Patterson, William.....“
Phipps, B.....“

Robinson, (Hon.) W. B.. “
Ross, D. P.....“
Russell, J. P. (M. D.).. “

Saunders, B.....“
Stayner, L.....“
Simmons, J. A.....“
Smith, A. M.....“
Shuttleworth, E. B.....“

Thompson, Thomas C. (Toronto Car Wheel
Works).

Toronto Horticultural Society. “

Whitelemon, William.....“
Workman, (Dr.) J.....“

Yarker. G. W.....“

MISCELLANEOUS.

Bark, W. H.....Detroit, Mich.

Gibb, B.....Montreal.
Gibb, J. J.....“
Gibb, Charles“

Lloyd, Gordon W.....Detroit,

Pratt, John(Pratt Corner, Buckingham. P. of Q)

Smith, A. M.....Lockport, N. Y.

Tingley, Isaiah (Hopwell Corner). Albert Co.
N.B.

Valiquit, Thomas.....St. Helène, P. of Q.

REPORT
OF THE
ENTOMOLOGICAL SOCIETY
OF ONTARIO,
1872,

INCLUDING A REPORT ON SOME OF THE NOXIOUS, BENEFICIAL AND
COMMON INSECTS OF THE PROVINCE OF ONTARIO.

PREPARED FOR THE HONOURABLE THE COMMISSIONER OF AGRICULTURE, ON
BEHALF OF THE SOCIETY.

BY

THE REV. C. J. S. BETHUNE, MA.,

*Head Master of Trinity College School, Port Hope; President of the Entomological Society of
Ontario; and Editor of the Canadian Entomologist;*

WILLIAM SAUNDERS,

Vice-President of the Entomological Society of Ontario; and

EDMUND BAYNES REED,

Secretary-Treasurer of the Entomological Society of Ontario.

Printed by Order of the Legislative Assembly.



Toronto:

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1873.

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ANNUAL REPORT
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EDMUND BAYNES REED,

Secretary-Treasurer of the Entomological Society of Ontario.

REPORT OF THE ENTOMOLOGICAL SOCIETY OF THE PROVINCE OF
ONTARIO, FOR THE YEAR 1872.

To the Honourable the Commissioner of Agriculture,—

SIR,—In compliance with our Statute of Incorporation, I have the honour to submit the Report of the Entomological Society of Ontario for the year 1872.

The annual meeting of the Society was this year held at the City of Hamilton, when the various reports were read, and the officers for 1873 duly elected.

I also beg leave to submit herewith a Report on some of the Noxious, Beneficial, and Common Insects of this Province, which has been prepared by the Rev. C. J. S. Bethune, Mr. William Saunders and myself, on behalf of the Society.

The publication of the CANADIAN ENTOMOLOGIST is still regularly continued, and the value of its pages has been greatly enhanced by the contributions of Entomologists both on this continent and in England, whose learned researches have rendered them authorities in their several branches of this science.

I have much pleasure in being able to report an increase in our membership, which has now reached 300, and that under the fostering care of your Department a more general interest in practical Entomology seems to be making its way steadily among the agricultural community.

To Canadians generally it must be gratifying to know that the course pursued by your Department in encouraging the efforts of the fruit-grower, and in disseminating a knowledge of the various insect friends and foes, has called forth warm commendations from several of the English scientific papers, and strong suggestions have been made that a similar course should be pursued by the Home Department.

I have the honour to remain,

Your obedient servant,

EDMUND BAYNES REED,

Secretary-Treasurer of the Entomological Society of Ontario.

London, Ont., Nov., 1872.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The second annual general meeting of the Society was held at the Court-House, Hamilton, Ontario, on Thursday Evening, September 27, 1872.

The President, the Rev. C. J. S. Bethune, M.A., in the chair.

The minutes of the previous meeting were read and confirmed.

The President's address, the report of the Council, and the financial statement of the Secretary-Treasurer were then read, and on motion duly received and adopted.

ELECTION OF OFFICERS FOR 1873.

The following Officers were then elected:

President.—Rev. C. J. S. Bethune, M.A., Trinity College School, Port Hope, Ont.

Vice-President.—W. Saunders, Esq., London, Ont.

Secretary-Treasurer.—E. B. Reed, Esq., London, Ont.

Council.—Prof. J. Macoun, Belleville; R. V. Rogers, Esq., Kingston; J. M. Denton, Esq., London; J. Pettit, Esq., Grimsby, A. Macallum, Esq., Hamilton.

Auditors.—J. H. Griffiths and Chas. Chapman, London.

On motion duly carried, it was resolved that the sum of \$100 be paid respectively to the President as Editor of the ENTOMOLOGIST, and the Secretary-Treasurer, for their services during the year 1872.

The state of the Library was discussed, and suggestions made with reference to its management.

The subject of the Report on Insects was laid before the meeting, and information elicited from the members respecting the prevalence of any special damage caused in their respective districts by the attacks of insects on field or garden crops. A vote of thanks was passed to Judge Logie for his courtesy in granting the use of his room for the annual meeting.

The meeting then adjourned.

REPORT OF THE COUNCIL.

In presenting the Second Annual Report, the Council feel highly gratified at the measure of success which has attended the Society during the past year. Confined, as its membership naturally is, to a small numerical portion of the public, it is yet very evident from the increased number of new members that the Society's efforts are appreciated, and that the science of practical Entomology is being gradually forced upon the notice of our most intelligent agriculturists and horticulturists. Fifty-four new members have entered our ranks this season, several of them being entomologists of some reputation. Our total number is now 300, made up as below:—

Ontario general.....	70
London Branch.....	51
Kingston	15
	<hr/>
	136 in Ontario
Quebec Province	14
Nova Scotia.....	3
British Columbia.....	1
	<hr/>
	154 in Canada.
United States	138
England.....	8
	<hr/>
Total.....	300 Members.

The Quebec Branch has ceased for the present to exist; but we hope shortly to see it reorganized.

Our membership in the United States is steadily increasing, and from this source we derive much substantial assistance both to our funds and our magazine. The publication of the CANADIAN ENTOMOLOGIST is still continued; the fourth volume is now nearly completed. The ENTOMOLOGIST is at present the only regularly-issued periodical on this Continent devoted to the science of Entomology. We must not omit to return our hearty thanks to those friends who have so kindly sent material to the editors, and by whose active assistance the latter have been able to keep up the good reputation of our periodical. Especially would we make honourable mention of Mr. V. T. Chambers, of Covington, Kentucky, whose admirable papers on the Micro Lepidoptera have attracted much attention both here and in England.

Some of our members have expressed an opinion that the ENTOMOLOGIST is too exclusively scientific, and that its pages have not been made sufficiently interesting to those amongst us who are at present only beginners in the study of the science. The Council feel that there is some justice in this remark, and we would suggest to our successors that perhaps it may be feasible to publish, in the pages of the ENTOMOLOGIST, the descriptions of our native Lepidoptera, taken from the original sources, as far as practicable, and thus give some assistance to those whose want of proper books, or inability to get even a reference to them, is an insuperable barrier to their working out for themselves the names of the various species in their collections.

The great drawback to the Society's efforts is a want of sufficient funds to procure the requisite scientific works on Entomology, many of which are very rare and costly, and also a proper supply of engravings and electrotypes of the various insects treated of. It is very difficult to meet the latter demand, owing to the want of a good artist who is well versed in the science, and able to give a correct representation of the originals; at the present time we have to send to the United States for the greater part of our wood-cuts and electrotypes.

The Council appointed a delegation to confer with the Commissioner of Agriculture on the subject of an increased grant, and there is every reason to hope that the result will be successful. In their application they will be strongly supported by the Fruit Growers' Association, who are making a similar appeal.

We have much pleasure in referring to the very generous donation of fifty dollars towards our library fund by the Fruit Growers' Association. It becomes indeed more manifest, as each succeeding year rolls on, that the cordial feeling existing between these two sister Societies is a strong element in their success, and furnishes fresh proof of the necessity of their continuing the work in the same friendly manner. We sincerely hope that this feeling will always continue.

The financial statement will, we think, be found satisfactory to the members.

The Council have thought it advisable to rent rooms at London for three years from July 1, 1872, at \$80 per annum; of this the London Branch pays \$30. We would here suggest and recommend that the expenses of fitting it up in a suitable manner be borne by the Society. The estimated cost is about \$100. It must not be forgotten that hitherto the Society has had no proper place for keeping the stock of books, cabinets, pins, corks, etc.

The library has been largely augmented during the year, and is now the nucleus of a very fair collection of entomological books.

The property of the Society is insured for \$850.

Arrangements have been made for the continuation of our Annual Reports, to be published as hitherto under the direction of the Department of Agriculture. If successful in obtaining the increased grant that we are now applying for, it is contemplated to issue with the Reports a coloured plate of insects, believing that by this means we shall be able to present to the public a much more definite and correct idea of the various insects treated of.

All of which is respectfully submitted.

EDMUND BAYNES REED,
On behalf of the Council.

FINANCIAL STATEMENT OF SECRETARY-TREASURER.

Receipts.

By Balance in Bank of Montreal.....	\$	233	73
" Members' Fees, including arrears.....		250	64
" Government grant for 1872.....		500	00
" Engraving, from Department for Annual Report, 1871.....		150	00
" CANADIAN ENTOMOLOGIST, sale of.....		40	98
" Pins, sale of.....		15	20
" Cork, ".....		13	87
" Library acct—Sale of Duplicate Pamphlets.....	4	75	}
" " Donation from Fruit Growers' Association.....	50	00	
" Expense acct, Exchange, &c.....		22	53
" Individual accts.....		18	06

\$1299 76

Disbursements.

To Expense acct., including Editor's salary for 1871.....	\$267	01
" Engraving for Annual Report.....	152	55
" CANADIAN ENTOMOLOGIST, printing Nos. 7—12, vol. iii., and Nos. 1—8, vol. iv.....	428	16
" Library acct.....	181	24
" Individual accts.....	15	61
" Balance in Bank of Montreal*.....	255	19

\$1299 76 \$1299 76

* This will be exhausted in meeting liabilities due up to December 31, 1872.

We certify that the above is a correct statement of accounts for the year ending Sept 19, 1872, as shown by the Treasurer's books, with vouchers for all disbursements.

CHAS. CHAPMAN, }
J. H. GRIFFITHS, } *Auditors.*

LONDON, Ont., Sept. 22, 1872.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1872.

To the Members of the Entomological Society of Ontario:

GENTLEMEN,—It is my happy privilege once again to congratulate you upon the completion of another year of progress in the annals of our Society. As you have already learnt from the very satisfactory Report of our excellent Secretary-Treasurer, the list of members of the Society has been largely added to during the past twelve months; the Library has been increased by the purchase of a number of valuable Entomological works; a cabinet and microscope have been bequeathed to us by our late lamented member, the Rev. Professor Hubbert, and our collections have been much improved; a comfortable and com-

modious suite of rooms has been procured in a central locality in London, Ont.—the present headquarters of the Society; the CANADIAN ENTOMOLOGIST has been regularly issued with, we trust, no diminution in the value and interesting character of its contents; our Second Annual Report on Noxious and Beneficial Insects, prepared by Messrs. Saunders and Reed, and myself, and containing notices of the insects affecting the Apple, Grape, Plum, Currant and Gooseberry, Wheat crops, Potato, Cabbage, Cucumber, Melon, Pumpkin and Squash, has been duly published by the Legislature of Ontario, and no doubt has long since been in the hands of you all. Such, gentlemen, is our record for the year that is now brought to a close, and, having in addition, a satisfactory balance-sheet from the Treasurer, we feel that mutual congratulations are not out of place, and that we who have been honoured with official positions in the Society, can look back upon our efforts in its behalf with at least the agreeable feeling that they have not been altogether in vain.

If we turn, moreover, from our own especial interests to the condition and prospects of American Entomology in general, we find much to afford us satisfaction and encouragement. No large work, indeed, on any particular order of insects has appeared during the past year, but many valuable reports of State Entomologists and portions of serial publications have been issued from the press,—among the latter, I may be pardoned, I am sure, for especially drawing attention to the exquisite illustrations of North American Butterflies contained in Mr. W. H. Edwards' invaluable work, which has now reached its Tenth Part. It speaks well, too, for the growing popularity of this branch of Natural Science, that Dr. Packard's useful "Guide to the Study of Insects" has already reached a *third* edition. A pleasing recognition of American Entomological work has recently, I may add, been manifested in England by the publication there, in a collected form, of the writings of the late Dr. Brackenridge Clemens, on the *Tineina* of North America, under the editorial supervision of Mr. H. T. Stainton, the well-known authority in that department of Lepidopterology.

Apart, however, from the position attained by the growth of our Entomological literature, the Science has this year received a recognition that cannot fail to be of great and permanent benefit to it. I allude to the formation of a special sub-section of Entomology at the recent meeting of the American Association for the advancement of Science. It will now be practicable for American Entomologists—to whatever part of the continent they may belong, whether to a Province of the Dominion or a State of the Union, from the Atlantic to the Pacific—to meet together for mutual conference on matters Entomological. Questions affecting the Science in general can hardly fail to arise from time to time, and demand the consideration, and, possibly, the decision of some such united council. Certainly, the proceedings of such a gathering will be of great interest and value to all who take part in them, if not, indeed, to the whole circle of Canadian and American Entomologists.

At the informal meeting at Dubuque, in August last, one subject was specially brought forward for discussion, which I cannot forbear alluding to more particularly here, especially as it may justly be considered the great question of the day in the Entomological world. I refer to the subject of the Specific and Generic Nomenclature of Insects. For some few years past indications have not been wanting of a growing inclination amongst the mass of Entomologists to resist the efforts made by some few able and distinguished writers to impose, year after year, new sets of names upon our common insects. This has been done partly by the revival of the long-forgotten names published at the close of the last century, or the beginning of the present one; and partly by the perpetual formation of new genera, and the re-distribution of species. The ability of the writers and the good work they have done in other respects, have caused these annoying changes to be acquiesced in for the most part, even though the object in view appeared to be rather the exhibition of their powers of research among antiquated tomes, or the supposed immortalization of themselves by the attachment of their own names to those of our familiar insects. I do not say that these men were actuated entirely by such motives, but assuredly one can hardly be accused of ill-natured criticism in ascribing much of the work to such causes. All must admit, I think, that nomenclature is but a means to an end, and that end is surely best attained by the preservation of all names that have been in universal acceptance for a period of years, and that cannot be set aside without disturbing the cabinets of every Entomologist in the land.

Matters in this respect have been brought to a climax by the recent publication of Mr. Scudder's "Systematic Revision of some of the North American Butterflies." I esteem Mr. Scudder so highly as a friend, and value so greatly the good scientific work that he has done,

that it pains me exceedingly to say a single word against anything that he may put forth. His projected "revision," however, is so sweeping and so revolutionary that I cannot forbear to make some remarks upon it. I know that his scientific labours are perfectly unselfish, and that he is entirely destitute of any of the conceit that I have just now referred to; I feel sure, too, that he is actuated only by the desire to benefit the science: yet I do deeply deplore the mode that he has adopted, and am convinced that if his views are pressed, a very great obstacle will be thrown in the way of the advancement and popularization of this department of Natural History. We all, I am sure, look forward with eager anticipation to the publication of his great work upon North American Butterflies, and have no doubt that it will be the most complete, the most scientific, and the most conscientious work of the kind in America; but assuredly its value will be very greatly marred and its general acceptance impaired, if he continues to insist upon all these radical changes.

To show you what these changes are, I will briefly state that in the pamphlet already published, and which is intended as a forerunner of the author's great work on the Butterflies, the following alterations are made in the received nomenclature:—The 228 species enumerated are distributed among 96 genera—almost a genus for every two species; of these 96 genera, 42 are entirely new, and 39 others are obsolete names of Hubner and others that have never been generally adopted; there are thus 15 familiar generic names left, but of these several are transferred from their present position to entirely different groups of species; for instance, the name of *Papilio* is removed from the genus of "Swallow-tailed Butterflies," and handed over to the sole use of the insect at present known as *Vanessa antiopa*! Further, among the 96 genera, there are no less than 45 that include but a single species apiece; and among the 228 species there are only 16 left with their present names unchanged! These figures are surely quite enough to show that I have not misapplied the terms "sweeping," "revolutionary," and "radical," as characterizing this work of revision. I would, then, most earnestly entreat Mr. Scudder, for the sake of the science itself, to reconsider his projected changes,—to discard all antiquated names in favour of those that have been for years in general acceptance, and to reduce his list of new genera to as small a number as he conscientiously can. If he does not, if he persists in his revision, I fear that his great work—most valuable as it will undoubtedly be in all other respects—will introduce more confusion, trouble and discord into American Entomology than a generation can get rid of. If these difficulties can be avoided in no other mode, it will remain for us all to unite together and agree to ignore all old forgotten names that may be brought forward, and retain all remaining of familiar species, until a general settlement of the question can be satisfactorily arrived at.

I fear, gentlemen, that I have now completely exhausted your patience; I shall therefore hasten to a close. But before doing so, let me remind you that, since our last annual meeting, our Society has lost by death one of its most valued members, Mr. B. Billings, of Ottawa, Ont. He was one of those devoted lovers of science who do good service by their honest, hearty work, but who, from their innate modesty and retiring disposition, shrink from all publicity. At times he contributed valuable papers to our little periodical, but he could never be induced to make any display of the knowledge he had acquired by his patient diligence both at home and in the field.

Permit me now, gentlemen, to resign into your hands the office that you have done me the honour of investing me with. I thank you for your kindness and courtesy towards myself and my colleagues, and with every wish for the continued success and prosperity of your Society.

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE.

Trinity College School, Port Hope,
September, 1872.

THE LONDON BRANCH.

The following officers were elected for 1872:—

President.....Mr. E. B. Reed,	Secretary-Treasurer.....Mr. H. Beck,
Vice-President..... Mr. J. M. Denton,	Curator. Mr. Joseph Williams.

The Branch numbers some 50 members

Since the establishment of the head quarters of the Parent Society, weekly meetings are held every Monday evening, at the Society's Rooms, on the corner of Dundas and Clarence Streets; and every effort is made to increase the interest felt in the Society's work.

The Monthly Business Meetings are also kept up, and fairly attended.

The Cabinet belonging to the Branch is being gradually arranged, and the various orders are now well represented both by Canadian and Foreign Specimens.

A resolution was passed at the annual meeting, That a local collection of Insects should be made of specimens obtained within walking distance of the city.

It was also resolved that Books should be received in the Library on Deposit, proper means being taken for their safe keeping.

Prizes were taken by the members of the Branch at the Western Fair held in October, the proceeds of which were devoted by the recipients to the general work of the London Branch.

It is in contemplation to establish a small Museum of Natural History Specimens in connection with the Branch.

KINGSTON BRANCH.

The Officers for 1872 were:—

<i>President</i>.....Prof. N. F. Dupuis,	<i>Secretary-Treasurer</i>.....Mr. R. V. Rogers,
<i>Vice-President</i>.....Mr. E. H. Collins,	Jun.

It numbers about 20 members.

Meetings have been regularly held during the year.

ADDITIONS TO THE LIBRARY.

Drury's Exotic Entomology, 4to.	3	Volumes.
British Beetles: by Janson. 1863	1	"
Farm-Insects: by J. Curtis.....	1	"
British Moths: by E. Newman	1	"
Agassiz's Lake Superior. 1850	1	"
Transactions of American Entomological Society, vols. 1-2	1	"
Illustrations of British Entomology: by J. Stephens.....	12	"
Histoire Generale des Lepidoterres de l'Amerique Septentrionale: par Le Dr. Boisduval et M. Le Conte. Paris, 1833.....	1	"
Newman's History of Insects: 1841	1	"
Fitch's Reports on Noxious Insects in State of New York: 1-2	1	"
Packard's Guide to the Study of Insects.....	1	"
Entomological Correspondence: Harris	1	"
The American Naturalist: 1-5.....	5	"
The Canadian Journal, vol 3, O. S.; vols. 1-6, N. S....	7	"
Systema Naturæ: Linnæus. 1756	1	"
The Canadian Naturalist: Gosse	1	"
Life of North American Insects: Jæger.....	1	"
Stainton's Manual of British Butterflies and Moths	2	"
Hind's Essay on Wheat Insects.....	1	"
Stephen's Manual of British Beetles: 1839	1	"
The Entomologist's Weekly Intelligencer	9	"
Insects At Home: by Rev. J. C. Wood. 1872	1	"
Reports of Commissioner of Agriculture and Arts, Ontario. 1870-1	1	"
Worcester's English Dictionary, Library edition.....	1	"
Geological Survey of Canada, 1853-56	1	"

Geology of Canada. 1866.	1	Volume.
“ “ Atlas. 1863 ...	1	“
Geological Survey of Indiana. 1869	1	“
“ “ Maps	1	“
Transactions of Indiana State Horticultural Society. 1870	1	“

BOOKS LENT ON DEPOSIT.

BY JOSEPH WILLIAMS—

The Canadian Naturalist and Geologist: O. S., 1-5	5	“
“ “ “ “ N. S., 1-8	8	“
Binney's Mollusks. vols. 1-4	2	“

BY E. B. REED—

Noel Humphrey's British Butterflies	1	“
Elements of Entomology: by Dallas.	1	“
Origin of Species: by C. Darwin.....	1	“
A Naturalist's Voyage Round the World: by do.....	1	“
Animals and Plants under Domestication: by do.	1	“
Siebold on True Parthenogenesis	1	“
Variation of Species: by V. Wollaston	1	“
The Naturalists' Note Book 1868	1	“
The Naturalists' Library: (Jardine). Insects.....	4	“
The Entomologist's Annual, 1856, 1860-1	3	“
Coleman's British Butterflies	1	“
The Insect Hunter ☞: by Newman	1	“

REPORT

ON SOME OF THE

NOXIOUS, BENEFICIAL, AND COMMON INSECTS

OF THE

PROVINCE OF ONTARIO.

INTRODUCTORY.

It has been a source of no small gratification to the writers of these Reports to receive so many kind expressions of appreciation of their labours. The favourable notices too, that have appeared in many English and American publications, afford them much encouragement in the pursuit of their Entomological labours, to which they regret they are unable to devote more than a small proportion of their time : each of them being necessarily engaged in other deeply engrossing pursuits, and having but little leisure at his command. The writers would again remind their readers that they are responsible only for their individual portions of the Report.

E. B. REED.

London, Ont., November, 1872.

INSECTS INJURIOUS TO THE GRAPE.

ADDENDA TO REPORTS FOR 1870-71.

BY W. SAUNDERS, LONDON, ONTARIO.

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| <p>No. 17. The Rose beetle, <i>Macroductylus subspinosus</i>, Fab.
 18. The Achemon Sphinx, <i>Philampelus achemon</i>, Drury.</p> | <p>No. 19. The Abbot Sphinx, <i>Thyreus Abbotii</i>, Swainson.
 The Grape Seed Insect,
 <i>Isosoma vitis</i> Saunders.
 20. A Cut worm, <i>Agrotis</i>—?</p> |
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In addition to the insects already referred to as injurious to the grape in Ontario in the Entomological Reports for 1870 and 1871, we have the following to submit to our readers.

No. 17. THE ROSE BEETLE (*Macroductylus Subspinosus*, Fab.).

This insect commonly known as the Rose-bug, which for some years past has been reported as doing damage to grape vines in the United States, has always been present with us; but it has not, heretofore, as far as we know, been much complained of by grape growers in any part of Ontario. In the latter part of May, 1872, we received a note from Mr. John Ferguson, of Union, near Port Stanley, Ont., accompanied by a box of these insects, asking for information as to what he should do to get rid of them as they were destroying his grape vines. In a subsequent note he says, "they eat the leaves especially of the Clinton. I found a few on my Concords, but the number was small in comparison to those found on the Clinton; they seem to prefer it, and if left alone, they soon eat all the outer tissue of the leaf, and leave nothing but the net-work."

The fact of this insect showing a preference for the Clinton vine has been remarked before by the late Mr. Benj. D. Walsh, State Entomologist of Illinois, who suggested the taking advantage of this preference on the part of the insect, as a means of lessening the labour attending their destruction. In his first annual report on the "Noxious Insects of Illinois", page 24, he says "In particular seasons, as is well known, and in particular localities this insect occurs in prodigious swarms, and gathers upon grape vines so as to strip them almost entirely of their leaves. The only known remedy that is practically available, is to jar them off the vines and kill them; and of course if we can induce them to concentrate their forces upon one particular vine, and leave the rest alone, the labour of destroying them will be very greatly diminished."

Luckily for the grape grower this can be done. There is concurrent evidence from a great number of different sources, that the Rose-bug prefers the Clinton to all other cultivated varieties, and will gather upon that and leave the others unmolested.

In the *Canada Farmer* for 1867, page 327, the Rose Beetle is referred to as occasionally injurious to the vine, as well as many other shrubs and trees, and mention is made of its great abundance every year in one locality at Oakville; it is also spoken of in Harris' "Insects Injurious to Vegetation" as hurtful to the vine.

Fig. 1.



In Figure 1, we have a representation of the perfect Beetle. It is called the Rose-bug on account of its appearing annually at the time of the blossoming of the rose, and of its having been first noticed as injurious to that flower. The body of this beetle measures a little more than one-third of an inch in length; it is slender in form and tapers a little towards each extremity. Its colour is dull yellowish when fresh, arising from its being covered with a greyish yellow down or bloom; and its sprawling legs are of a dull pale reddish hue, with the joints of the feet tipped with black, the feet are also armed with very long claws. The down on its body is easily rubbed off, and when this is done there is quite a change in the appearance of the insect, the head, thorax, and the under side of the body becoming of a shining black. The following excellent account of its history is given by Dr. Harris.

"The unexpected arrival of these insects in swarms, at their first coming, and their sudden disappearance at the close of their career, are remarkable facts in their history. They come forth from the ground during the second week in June, or about the time of the blossoming of the damask rose, and remain from thirty to forty days. At the end of this period the males become exhausted, fall to the ground and perish, while the females enter the earth, their eggs, return to the surface, and after lingering a few days die also."

"The eggs laid by each female are about thirty in number, and are deposited from one to four inches beneath the surface of the soil; they are nearly globular, whitish, and about one-thirtieth of an inch in diameter, and are hatched twenty days after they are laid. The young larvæ begin to feed on such tender roots as are within their reach; and when not eating they lie upon the side; with the body curved so that the head and tail are nearly in contact; they move with difficulty on a level surface, and are continually falling over on one side or the other. They attain their full size in the autumn, being then nearly three-quarters of an inch long, and about an eighth of an inch in diameter. They are of a yellowish white colour, with a tinge of blue towards the hinder extremity, which is thick and fleshy, and rounded; a few short hairs are scattered on the surface of the body; there are short legs, namely, a pair to each of the first three rings behind the head, and the latter is covered with a horny shell of a pale rust colour. In October they descend below the reach of frost, and pass the winter in a torpid state. In the spring they approach towards the surface, and each one forms for itself a little cell of an oval shape by turning round a great many times, so as to compress the earth and render the inside of the cavity hard and smooth. Within this cell the grub is transformed to a pupa during the month of May by casting of its skin, which is pushed forward in folds from the head to the tail. The pupa has somewhat the form of the perfect beetle; but it is of a yellowish white colour, and its short stumpy wings, its antennæ and its legs are folded upon the breast; and its whole body is enclosed in a thin film that wraps each part separately. During the month of June this filmy covering is rent, the included beetle withdraws its body and its limbs, bursts open its earthen cell, and digs its way to the surface of the ground. Thus the various changes, from the egg to the full development of the perfect beetle, are completed within the space of one year."

Although these insects have many natural foes, such as carnivorous ground beetles, dragon flies, toads, insectivorous birds, domestic fowls, &c., yet they often need the interfering hand of man to keep them within due bounds. The best means of disposing of them is to jar them from the vines on which they are resting with a sudden and violent jar, to let them spread below to receive them. They are naturally sluggish, and do not fly readily, but are fond of congregating in masses on the foliage they are consuming; and hence, in the morning, before the day becomes warm, they can be easily shaken from their resting places, and disposed of, either by burning them, or by throwing them into scalding water.

No. 18. THE ACHEMON SPHINX. (*Philampelus Achemon*, Drury.)

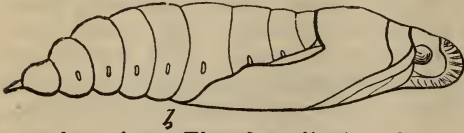
FIG. 2.



The caterpillar of this species (see figure 2) is a formidable looking creature, measuring, when full grown, if at rest, about three inches, and, when crawling, about three and a half inches. While young, as this larva feeds singly, it does not attract much attention, but, as it approaches maturity, it consumes, in a short time, large quantities of leaves, rendering long branches of the vine quite leafless. It is usually met with of full size late in August, and feeds on the American ivy (*Ampelopsisquinque folia*) as well as on the grape vine. The following descriptions of the larva and perfect insect are compiled chiefly from Mr. Riley's second report on the insects of Missouri.

The largest segment in the body of the larva is the third behind the head; the second is but half its size, and the first still smaller; and, when at rest, it usually withdraws the head and the two next segments within the third, as shown in the figure. This caterpillar varies much in colour; when young, it is usually green, with a long slender reddish horn, rising from the last segment but one, and curving backwards. When full grown, the general colour is sometimes green, but more frequently a pale straw, or reddish brown, and the long recurved horn has disappeared, its place being occupied by a polished tubercle. The pale straw colour, or reddish brown deepens at the sides, and finally merges into a rich brown. A broken line of brown runs along the back, and another unbroken, with its upper edge fading gradually, extends along each side. It has six scalloped cream-coloured spots on each side, and is covered more or less with minute spots, which are dark on the back, but light and annulated at the sides. There are also from six to eight transverse wrinkles on all but the thoracic and caudal segments. The head, front segments and breathing holes incline to flesh colour, while the prolegs and caudal plate are deep brown

FIG. 3.



smooth cavity. The chrysalis (see fig 3) is of a dark shining mahogany brown colour, roughened, especially on the anterior edge of the segments in the back.

FIG. 4.



The moth (figure 4) is of a brownish grey colour, variegated with light brown, and with the dark spots shown in the figure deep brown. The hind wings are pink, with a dark shade across the middle, still darker spots below this shade, and a broad grey border behind. It is usually single brooded, the chrysalis remaining in the ground through the fall, winter and spring months, and producing the moth towards the latter part of June.

This insect has rarely presented itself in sufficient numbers to prove alarming to the vine grower, either here or in the United States. Indeed, with us, it has hitherto been a rare insect; nevertheless, since some usually rare insects occasionally appear in comparative abundance, we have thought it best to present our readers with a history of the species, so

that all may be able to recognize it. Should it at any time prove troublesome, its large size makes it so conspicuous, that it might be easily controlled by hand picking.

No. 19. THE ABBOT SPHINX. (*Thyreus Abbotii*, Swainson.)

We have never yet met with the larva of this insect, but have seen specimens of the moth, which were captured in the neighbourhood of Hamilton, Ont. Doubtless, some of our readers will have met with it. Figure 5 shows both larva and moth. The following

FIG. 5.



description of this species occurs in Mr. Riley's second report, already alluded to, which we shall take the liberty of copying:—

"This is another of the large grape feeding insects occurring on the cultivated and indigenous vines, and on the Virginia Creeper, and having, in a full grown larva state, a polished tubercle, instead of a horn at the tail. Its habitat is given by Dr. Clemens as New York, Pennsylvania, Georgia, Massachusetts, and Ohio; but, though not so common as the Sphinx moths previously described, yet it is often met with both in Illinois and Missouri. The larva, which is represented in the upper part of figure 5,

varies considerably in appearance. Indeed, the ground colour seems to depend in a measure on the sex, for Dr. Morris describes this larva as reddish brown, with numerous patches of light green, and expressly states that the *female* is of a uniform reddish-brown, with an interrupted dark brown dorsal line, and transverse striae. I have reared two individuals, which came to their growth about the last of July, at which time they were both without a vestige of green. The ground colour was dirty yellowish, especially at the sides. Each segment was marked transversely with six or seven slightly impressed fine black lines, and longitudinally with wider non-impressed dark brown patches, alternating with each other, and giving the worm a checkered appearance. These patches become more dense along the subdorsal region, where they form two irregular dark lines, which, on the thoracic segments, become single, with a similar line between them. There was also a dark stigmatal line, with a lighter shade above it, and a dark stripe running obliquely downwards from the posterior to the anterior portion of each segment. The belly was yellow, with a tinge of pink between the prolegs, and the shiny tubercle at the tail was black, with a yellowish ring around the base. The head, which is characteristically marked, and by which this worm can always be distinguished from its allies—no matter what the ground colour of the body may be—is slightly roughened and dark, with a lighter broad band on each side, and a central mark down the middle, which often takes the form of an x. This worm does not assume the common sphinx attitude of holding up the head, but rests stretched at full length; though, if disturbed, it will throw its head from side to side, thereby producing a crepitating noise."

"The chrysalis is formed in a superficial cell on the ground; its surface is black and roughened by confluent punctures, but, between the joints, it is smooth, and inclines to brown; the head case is broad and rounded, and the tongue case is level with the breast; the tail terminates in a rough flattened wedge-shaped point, which gives out two extremely small thorns from the end."

"The moth appears in the following March or April, there being but one brood each year. It is of a dull chocolate or greyish brown colour, the front wings becoming lighter beyond the middle, and being variegated with dark brown, as in the figure. The hind wings are sulphur-yellow, with a broad dark brown border, breaking into a series of short lines, on a flesh-coloured ground, near the body. The wings are deeply scalloped, especially the front ones, and the body is furnished with lateral tufts. When at rest, the abdomen is curiously curved up in the air."

Should this worm at any time become sufficiently numerous to prove destructive—

which is scarcely probable—we could not suggest a better remedy than that given for the preceding species, namely, hand picking.

THE GRAPE SEED INSECT. (*Isosoma Vitis*, Saunders.)

This insect, which was fully described in the report of the Entomological Society for 1870, has not, as far as we have been able to ascertain, affected the grape to any extent in Canada during the past year. It seems, however, to be much more widely distributed than we at first supposed. During the latter part of August, we spent a few days at Dubuque, Iowa, and while there paid a visit to the market, where there were offered for sale large quantities of a species of wild grape, which was fully ripe at that early period in the season, and which, we were told, was much used for wine making. On opening the seeds of these grapes we found a large proportion inhabited by the larvæ of this insect, a small, fat white grub. See figure 6, where it is shown much magnified. An outline of the little creature of the natural size is given below. The larvæ at that time were more than two-thirds grown.

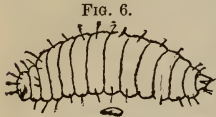


FIG. 6.

For the benefit of those who may not have access to the report for 1870, we give a figure also of a perfect fly, almost identical in appearance with that from which this larva is produced, and well serves the purpose of illustrating

FIG. 7.



it. See figure 7. *a* Represents the female; *c* and *e*, her antennæ and abdomen; *b*, *d*, and *f* give similar details of the male. The larva lives within the seed, and consumes the kernel during the summer; undergoes its change to chrysalis also within the seed, and eats its way out of it in the early part of the summer following, when in the perfect or winged state.

No. 20. A CUTWORM. (*Agrotis*—?)

This destructive pest, which is referred to at length in this report, when treating of the insects affecting the strawberry, has also proved very destructive to the vine. For details of the history and habits of this insect, the reader is referred to No. 7, Injurious to the strawberry.

INSECTS INJURIOUS TO THE STRAWBERRY.

BY W. SAUNDERS, LONDON, ONT.

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| <ol style="list-style-type: none"> 1. The Strawberry Root or Crown Borer (<i>Anarsia lineatella</i>, Zeller). 2. The White Grub (<i>Lachnosterna quercina</i>, Knoch). 3. A Strawberry Leaf-Roller (<i>Anchylopera fragaria</i>, Riley). 4. A second Strawberry Leaf-Roller (<i>Exartema permundana</i>, Clemens). 5. A third Strawberry Leaf-Roller (<i>Lozotenia fragariana</i>, Packard). | <ol style="list-style-type: none"> 6. Other Strawberry Leaf-Rollers. 7. A Cut Worm (<i>Agrotis</i>). 8. The Measuring Worm (<i>Angerona crocatoria</i>). 9. The Smeared Dagger (<i>Acronycta obliterata</i>, Sm. & Abb.). 10. The Strawberry False Worm (<i>Emphytus maculatus</i>, Norton). 11. <i>Osmia Canadensis</i>, Cresson. 12. A Strawberry Bug (<i>Corimelaena</i> — ?) |
|---|---|

Fortunately, there are not many insects injurious to this useful and now extensively cultivated fruit. It has, however, several special foes, which have in some localities at times proved troublesome, and there are a few other general feeding insects, which take to strawberry, if it lie in their path, as readily as they will to any other green thing they may meet with. Still, in any case, the strawberry grower must not look upon insects as an unmixed evil, admitting of no toleration, for he would find it very difficult indeed to secure a good crop without their aid. In some varieties of strawberries, the flowers are more or less imperfect, the male organs being more fully developed in some, the female organs in others, so that fertilization can rarely take place, excepting through the agency of insects, who visit flower after flower, and carry and scatter the fertilizing pollen with them wherever they go; and even with the perfect flowers their presence and unconscious labour is required to ensure a liberal crop of well formed fruit.

•AFFECTING THE ROOT.

THE STRAWBERRY ROOT OR CROWN BORER (*Anarsia lineatella*, ZELLER).

This is a very troublesome insect where it occurs plentifully, and takes a liking to the strawberry; but, happily, this is not often the case. We have never seen it affecting this fruit anywhere excepting on the grounds of Mr. Luke Bishop, of St. Thomas, Ont., who first called our attention to it about the middle of May, 1869, when he brought us a few specimens. During 1868 and 1869, they played sad havoc with his plants, destroying a large proportion of them. We believe they have been less troublesome since. The borer is a small grub or caterpillar, nearly half-an-inch long, and of a reddish colour, which eats irregular channels in various directions, through the crown and larger roots of the plant, causing it either to wither and die, or else to send up weakened and almost barren shoots.

The following description of this larva was taken on the 20th of May, 1869:—Length, .42 inch. Head rather small, flattened, bilobed, pale brownish yellow, darker in colour about the mouth, and with a dark brown dot on each side.

The body above is semitransparent, of a reddish pink colour, fading into lull yellow on the second and third segments; anterior portion of second segment smooth and horny-looking, and similar in colour to head. On each segment are a few shining reddish dots—yellowish on the anterior segments—or faintly elevated tubercles, from each of which arises a single, very fine, short, yellowish hair, invisible without a magnifying power. These dots are arranged in imperfect rows, a single one across the third, fourth, and terminal segments, and a more or less perfect double row on the remaining segments.

The under surface is of a dull whitish colour, becoming faintly reddish on the hinder segments, with a few shining whitish dots; those on the fifth, sixth, eleventh, and twelfth segments, being arranged in transverse rows, in continuation of those above. Feet and prolegs yellowish white, the former faintly tipped with dark brown. It spins a slight silken thread, by means of which it can suspend itself for a time at a short distance from its place of attachment. The specimen described produced the moth on the 8th of July following.

On the 8th of June, we visited the grounds of Mr. Bishop, and found his strawberry beds badly infested—indeed, almost destroyed—by this pest, along with a leaf-roller, to be presently described. We believe there are two broods of this borer during the year. That which we call the first brood is the one in which the larva passes the winter in a young or half-grown state, in the crowns and roots of the plants; while the second brood infests the young runners, soon after the fruiting season is over. The borer eats irregular channels through the crown, sometimes excavating large chambers, at other times merely girdling it in various directions, here and there eating its way to the surface. Whether these various chambers and channels are due to the presence of more worms than one in a single root we were unable to determine with certainty. Most of the cavities contained a moderate-sized soft silky case, which, when opened, appeared nearly full of exuviae. These cases had served as a place of retreat during winter. Most of the larvæ found at this date had eaten their way to the upper part of the crown of the plant, just under the surface, and were found about the centre, with a hole eaten through the surface. From the fact that a large number of roots were examined, and although almost every one was more or less injured, but very few larvæ were to be found, we inferred that the probabilities were that the larvæ, when mature, usually leave the root, and undergo the change to chrysalis, either under the surface of the ground, or amongst rubbish at the surface. One chrysalis only was found, and that was in the cavity of a root. As soon as Mr. Bishop had discovered the destructive character of this pest, he, with commendable caution, refused to sell any more plants until the insect was subdued, for fear of spreading the evil. He is of opinion that the insect came to him from some part of the United States, with some plants of the Hooker strawberry, as it was in a patch of these, so obtained, that he first noticed the insect working.

Specimens of the larvæ got late in the season wintered over, and were examined on the 12th of January following, when they did not appear so plump in body as those examined in July. They appear to spend most of the winter in a torpid state within the silken cases before mentioned. Several were found thus sheltered at this time, and one, whose original abode had been disturbed in the fall, had prepared for itself a similar casing within the fold of a strawberry leaf. In this latter instance, the larva seemed quite active, moving itself briskly about whenever touched.

The chrysalis of this insect is very small, and of the usual dark reddish brown colour. That one which was found on the 8th of June produced the moth on the 12th of July.

The perfect insect is a very small dark grey moth, which was accurately described by the late Dr. Clemens, in the *Proceedings of the Academy of Natural Sciences, Philadelphia*, for 1860, page 69, under the name of *Anarsia pruniella*, as he at that time supposed it to be distinct from the European insect. We quote his description:—"Head and face pale grey; thorax dark grey. Labial palpi dark fuscous, externally, and pale grey at the end; terminal joint grey, dusted with dark fuscous. Antennæ grayish, annulated with dark brown. Fore wings grey, dusted with blackish brown, with a few blackish brown spots

along the costa, the largest in the middle, and short blackish brown streaks on the median nervure, subcostal, in the fold, and one or two at the tip of the wing; cilia fuscous-grey. Hind wings fuscous-grey; cilia grey, tinted with yellowish."

"The larva was taken, June 16, full-grown, and about to transform on the limbs of the plum. Its head is black, body uniform reddish brown, with indistinct papula, each giving rise to a hair, and with pale brown patches on the sides of the third and fourth segments; shield and terminal prolegs black. One specimen had secreted itself under a turned-up portion of the old bark of the trunk. The cocoon is exceedingly slight, and the tail of the pupæ is attached to a little button of silk."

Mr. C. V. Riley, who has kindly determined this moth for me, draws attention to the coarse nature of the scales on the wings, appearing something like minute granulations. He also observes that, in some specimens of the moth, the dark marks are more or less obsolete. Mr. Riley has bred this moth from larvæ boring into tender peach twigs, and remarks that "the larva, when young, is paler, with a paler head, the body being yellow, each joint with a crimson band superiorly, narrow on the thoracic joints, and broad, and divided transversely by a fine pale line on the feet." Mr. J. Pettit, of Grimsby, Ont., has bred it from the twigs of the peach, and it breeds in peach twigs, also, in Europe; and Professor Townsend Glover, of the Department of Agriculture, Washington, has found it feeding on the buds of the peach.

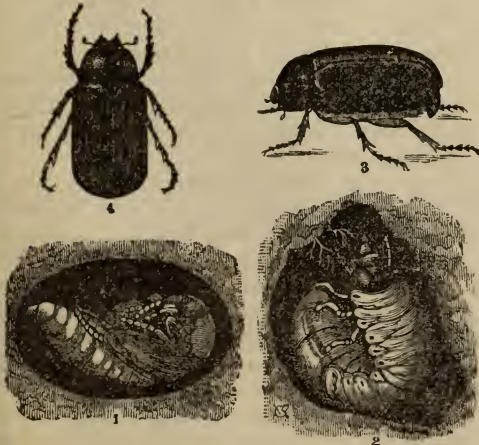
Since this moth is found in Europe as well as in this country, it is in all probability an imported insect, and one that is widely disseminated. We are not aware that it has been recorded as injurious to the strawberry before, and we sincerely hope that this apparently lately developed liking for this food plant will be limited to the specimens residing in the district referred to. Should it ever become general, it would prove a most grievous pest to the strawberry grower.

Remedies.—Happily even this small creature is not without its enemies. Among some larva sent to Mr. Riley, several, he says, contained parasites: probably these tiny friends have been doing much in the past, and are still doing much, to limit their increase. Nature's operations, although often silent, are usually sure. Possibly severe cold or extreme heat may also affect them. Man can do little in this instance, unless he digs up his strawberry roots and burns them.

2. THE WHITE GRUB (*Lachnosterna quercina*, KNOCH).

The White Grub, or larva of the May-beetle—*Lachnosterna quercina*, Knoch—is often loudly complained of. Both in the larval and perfect conditions, it is at times very destructive: now and then the ground in certain localities seems full of the larvæ, they turn up with every spadeful of earth, and the plough will expose them by hundreds.

FIG. 8.



In figure 8, we give representations of the insect in its different stages:—2 illustrates the full-grown grub; 1 the chrysalis, and 3 and 4 the perfect beetle. Everyone must be familiar with the May-beetle, or May-bug, as it is sometimes called—a buzzing beetle with a rapid, but wild and erratic flight, which comes thumping against the windows of lighted rooms at night, in May and early in June; and where the windows are open it dashes in without a moment's consideration, bumping itself against walls and ceilings, occasionally dropping to the floor; then suddenly rising again, it sometimes lands unexpectedly against one's face or neck, or it may be on one's head; where its sharp claws get entangled in the hair, and its further progress is stayed until a forcible

removal takes place. At such times it is quite a terror to those whose nerves are weak.

Although thousands of these summer-evening tormentors are yearly, yea, nightly, trodden to death during their brief season, yet thousands of others rise to supply their places, and sometimes they are reinforced by armies of tens of thousands. Then it is that oftentimes serious damage is done to trees whose foliage they consume, their powerful and horny jaws being admirably adapted for cutting and grinding the leaves. Cherry trees are frequently injured in this way; indeed, these beetles are not at all particular as to what they eat—the oak, the Lombardy poplar, and many other kinds of trees, are just as readily attacked, if in their way.

The *Canada Farmer* for July, 1866, contains an excellent article on this subject, by our esteemed friend, Rev. C. J. S. Bethune, Port Hope, with details of the habits and history of this insect, which we cannot do better than re-produce:—

“A friend in Cobourg has recently mentioned to us, that his strawberries have been very much injured by a large white grub which attacks the roots, and thus destroys at once the vitality of the plants. From his description of the marauder, we have no doubt that it is the larva of the common May-beetle or Cockchafer—*Lachnosterna Quercina*, Knoch—which is so abundant just now. In the western part of Cobourg, and, indeed, almost all over the neighbourhood, these beetles may be seen on any fine evening, in perfect myriads flying about the trees, the leaves of which they devour in this stage of their existence.

“This insect has been long and most unfavourably known as very destructive to vegetation, both in its larval and winged state. In the former, it is commonly called the ‘white grub:’ it is then a soft, white worm, with a brownish head, and six legs, becoming, when fully grown, about as large as one’s little finger. It is usually found partially coiled up, near the root of the plant on which it is feeding. Unlike many of our destructive insects, the devastations of each individual are not confined to a single year, but it continues several years in the grub state, and, finally, changes early in the spring into a dark chestnut brown beetle, nearly an inch long, with rather long legs, and its breast covered with yellowish hairs. It flies about at night with a loud buzzing noise, and in a most clumsy manner, as if it had very little control over its movements, to the great discomfort and perturbation of nervous persons, especially when attracted into houses, as it often is, by the light. Its period of flight is usually limited to the months of May and June, though it is sometimes met with a little later in the season. The grubs are very commonly dug up, early in the spring, in gardens, in various stages of maturity; the plough, too, brings many more to the light of day. It is hardly necessary, we suppose, to tell our readers that in such cases they should be destroyed at once, and without mercy, by treading under foot. The perfect insects may be collected and put an end to, by shaking them from the trees they infest, into a cloth spread beneath for their reception, and then throwing them into boiling water; the specimens thus cooked will be readily eaten by pigs, which, in fact, root up and devour multitudes of the grubs without waiting for any previous culinary operations. The best time to shake them from the trees is early in the morning, when they become sluggish and stationary, their flight being confined to the hours of darkness.”

The larva of this May-bug does not by any means confine its attention to strawberry roots, but devours potatoes, corn and other vegetables, also the roots of grass, and this to such an extent that at times meadows are utterly ruined by them, so that the turf may be turned up like a carpet, so utterly are the roots consumed.

After the pairing of the sexes, the males soon die, while the females burrow into the ground some six inches or more, where they deposit their eggs from fifty to a hundred in number, after which they come out again from the earth, but their mission having now been accomplished, they soon die. The eggs soon hatch into white grubs, which begin at once to feed on the roots of any plants within their reach. During the summer, they burrow about and feed not far from the surface; but as winter approaches, they dive deeper into the soil, below the reach of frost, where they remain torpid until spring. At the close of the third summer, they cease feeding, and bury themselves sometimes two feet deep in the earth, and there, in an oval cavity, formed by the motions of the larva from side to side, the change to chrysalis takes place, the beetle digging its way through and appearing at the surface in due season. Sometimes the transformation to

the beetle state takes place in the fall, for we have several times found fresh specimens at this season, showing by their softness that they had but lately escaped from the pupa case. Such perfect insects secrete themselves under ground during winter, and appear with the rest of their troop in spring.

Remedies. Man can do but little towards checking the ravages of this insect pest, but nature has provided many means for keeping them within due bounds. Some birds, such as the crow and common fowl, eat them greedily, indeed the crow may often be seen following the track of the plough in search of these choice morsels. As already stated pigs eat them with avidity, and will root up the ground most thoroughly in their search for them, and no doubt many other insect eating animals and birds devour them with equal delight. These grubs are also liable in some parts to the attacks of a peculiar disease, which manifests itself in the development of a fungous growth, which sprouts out in a curious manner from about the head, and the result is the death of the insect so occupied. The beetles, as already stated, may be best destroyed by shaking them from the trees and throwing them into scalding water.

AFFECTING THE LEAVES.

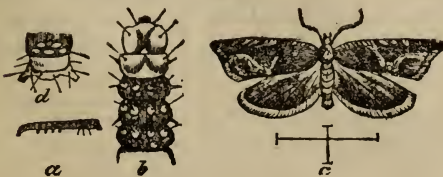
3. A STRAWBERRY-LEAF ROLLER (*Anchylopera fragaria*, RILEY.)

This insect, which is also known in some parts of the United States as *the* strawberry leaf-roller, is but one of the several insects which affect the strawberry in this way. It has been found very troublesome in some of the adjoining States for several years past, and in all probability it occurs in Canada also. In the *Canada Farmer* for August, 1867, some account is given of a leaf-roller found by Mr. Chas. Arnold, of Paris, Ont., eating the leaves of his strawberry plants, which has been referred, and probably correctly so to this species. Possibly some of our readers may recognise the insect after reading the following description of its appearance and mode of working, condensed chiefly from a paper by Mr. C. V. Riley, State Entomologist of Missouri, and published in the *American Entomologist* for January, 1869 :

The larva or caterpillar measures when full grown a little more than one third of an inch. It is largest on the front segments, tapering slightly towards the hinder ones. In colour it varies from a very light yellowish brown to a dark olive green or brown, with a body soft and somewhat semi-transparent. Its head is of a shining yellowish brown colour, with a dark eye-spot on each side. The second segment has a shield above similar in colour and appearance to the head, and on each segment or ring of the body are a few pale spots, from each one of which arises a single hair. The hinder segment has two black spots, while the under-surface, feet and prolegs are about the same colour as the body above. In certain parts of North Illinois and Indiana this insect has been ruining the strawberry beds in a most wholesale manner. It crumples and folds the leaves, feeding on their pulpy substance, and causing them to appear dry and seared. It most usually lines the inside of the fold with silk. There are two broods during the year, and the worms of the first brood, which appear during the month of June, change to the pupa state within the rolled up leaf, and become moths during the fore part of July.

The moth has the head, thorax, and fore wings reddish brown, the latter streaked and spotted with black and white; the hind wings and abdomen are dusky. The wings when spread measure nearly half an inch across. After pairing the females deposit their eggs on the plants, from which eggs in due time there hatches a second brood of worms, which come to their growth towards the end of September, and changing to pupæ pass the winter in that state.

FIG. 9.



In the accompanying figure 9, drawn from nature by Mr. Riley, *a* represents the larva natural size, *b* the head and four succeeding segments of the body, and *d* the terminal segment, all magnified; *c* the moth, also enlarged, the hair lines at the sides showing the natural size.

4. A SECOND STRAWBERRY LEAF-ROLLER (*Exartema (Tortriz) permundana*, CLEMENS.)

This species was found in immense numbers attacking Mr. Bishop's strawberry vines in 1868 and 9, along with the "crown borers" already described. All these leaf rollers have the habit of rolling up the leaves and fastening them with silken threads, and living within the enclosure, but this little creature prefers taking the flowers, expanded and unexpanded, and bringing them together with silken threads into a sort of ball, it feasts on their substance. This peculiarity makes its attacks much more annoying and destructive than any mere consumption of leaves would be. It is small in size, of a green colour, and with very active habits, wriggling itself quickly out of its hiding place when disturbed. It is the progeny of a small moth, with its fore wings yellowish varied with brown streaks and patches, and darker hind wings, who lays her eggs quite early in the spring, placing them upon the developing leaves, where the newly hatched larvæ may be sure to enjoy an abundance of tender and juicy food, and these attain to nearly their full growth, and are just then capable of most mischief, at the time when the plant is coming into full flower. During 1869, Mr. Bishop must have lost nearly half his crop of strawberries from this cause alone. We have found this species attacking the wild strawberry in different localities, and have little doubt but that it is widely disseminated; but why it should so persistently attack the plants in one locality, and multiply so amazingly there, while comparatively unknown in other places, we are unable to do more than guess at: possibly they may have been kept under in other localities by parasites which feed on them. The larvæ of most moths are liable to attack from one or more of such enemies, and we know that this species is not exempt, for several of the larvæ which we succeeded in bringing into the chrysalis state, instead of producing moths, yielded specimens of these small parasitic flies instead.

We are indebted to Mr. C. V. Riley for determining this species for us. It was described by Dr. Clemens in the Proceedings of the Academy of Natural Sciences, Philadelphia, for August, 1860, where the author states that "the larvæ bind together the terminal leaves of *Spiræa*." Hence it would appear that this insect does not confine itself to the strawberry as a food plant, and may possibly be quite a general feeder.

The chrysalides of this species were of the usual dark brown colour, from which the moths made their escape from the eighth to the twelfth of July.

5. A THIRD STRAWBERRY-LEAF ROLLER (*Lozotænia fragariana* PACKARD.)

This insect has been reared by Dr. A. S. Packard, of Salem, Mass., from the wild strawberry, and is described in his "Guide to the Study of Insects." The larva was found in Maine early in June, in folds of the leaves; the moth appearing about the middle of the same month. The moth is very pretty, and measures, when its wings are expanded, eight-tenths of an inch. Its fore wings are red, darker on the outer half, and with a large triangular white spot near the middle of the front edge; the outer edge of the spot is hollowed out. The outer edge of the wing is pale especially in the middle, and about the same colour as the head and thorax; the hind wings and abdomen are of a whitish buff, underneath they are whitish. It is quite likely that this species occurs also in Canada, although it has not yet been observed.

6. OTHER STRAWBERRY LEAF-ROLLERS.

FIG. 10.



Several other species have been observed by us affecting the strawberry, all of them green, with pale or dark brown heads, and more or less semi-transparent bodies, sometimes tinged in parts with yellowish. One of these, the oblique banded leaf-roller *Lozontænia rosaceana*, Harris' is a very general feeder, and has been already referred to in the reports of the Entomological Society of Ontario for 1870 and 1871, and to these the reader is referred for its full history. We shall, however, reproduce the figures relating to this insect, as they will serve somewhat to illustrate all the leaf-rollers spoken of, since

FIG. 11.



they have more or less of a family resemblance in all their different stages. Fig. 10 shows the caterpillar and chrysalis, and Fig. 11 the perfect moth, with its wings expanded as well as folded.

The life history of the other leaf-rollers referred to above has not yet been fully worked out, and as they have not thus far attracted much attention, we pass

them over with this brief notice.

Remedies. Since all these leaf-rollers feed on the foliage and come out of their hiding places for this purpose, an application of hellebore and water on the leaves would probably destroy many of them. It has also been recommended to plough deeply either in the Autumn or Spring, such beds as may be badly infested, with the view of burying the chrysalides sufficiently deep to ensure their destruction. Hand-picking may also be practised with advantage, as the curled leaves are easily seen.

A CUT-WORM (*Agrotis*).

This is an insect which has been most unusually injurious during the past season on the fruit plantations of Mr. Mountjoy and Mr. Bunning, on the borders of Lake Huron, near Sarnia. At first its habits were not understood, and it pursued the "even tenour of its way" uninterrupted night after night; the perplexed fruit growers not knowing why it was that every day the foliage on their fruit trees and strawberry patches grew slender. But soon it was found that the enemy was a night worker, and this knowledge of its habits was at once turned to account, and night watches instituted with the view of counteracting this insidious foe, and with good results, as many as 1800 having been killed by Mr. Mountjoy in one night.

Their manner of life may be thus described. The moths from which the worms are produced appear on the wing during the month of August, and soon after pair, and deposit their eggs on the ground or on some plant or other substance near the ground; they probably hatch in the fall, and feed for a time on the leaves of grass and other plants then abundant, and after attaining but a small measure of their growth, they burrow into the earth, and there remain in a torpid state during the winter; but the warmth of spring revives them and soon they are abroad and active. During the first few weeks while they are still small, the quantity of food they consume is not sufficient to attract much attention; but as they approach nearer maturity, that is about the time when the trees first put out their tender foliage, the quantity of food they consume is enormous. In the day time they rest tolerably secure from harm, by burrowing a short distance underground, and towards night they sally forth from their hiding places to begin their work of destruction. They are extremely active in their movements, and travel over quite a space of ground in a very short time, eating almost everything green in their way; they climb the trunks of trees, and consume not only the young foliage, but the buds also, leaving the limbs almost bare, and before the light of another day dawns they retreat to their hiding places and rest in quiet. When full grown they burrow deeper into the earth, and form for themselves an oval cell or chamber, in which they change to chrysalis, and from which the moths are produced early in the autumn to continue the race.

In this instance these caterpillars took a decided liking for the strawberry vines, and in spite of the most vigilant search for them day after day and night after night, they defoliated a large patch of the vines to such an extent that they were utterly ruined. Nearly all through the month of June they literally swarmed and scarcely a night passed without considerable damage being done by them. It was late in the month when we received a package of the larvæ from Mr. Mountjoy, and from which the following description was taken on the second of July:—

Length one and a half inches, cylindrical, coiling the body up when disturbed, and discharging a green liquid freely from the mouth when handled.

Head small, rather flat, scarcely bilobed, of a dull brownish yellow colour, with a triangular looking furrow in front, the base of the triangle being towards the mouth; between the lobes the colour is of a slightly darker shade. On the upper part of each

lobe is a blackish dot, and two or three more on each side near the base of the palpi ; mandibles or jaws tipped with dark brown.

The body above is greenish grey and semi transparent ; on the second segment or ring there is a horny plate above, similar in colour to the head, slightly bordered behind with dark brown. There is a dark greenish line down the middle of the back with a whitish centre, the green colour becoming fainter and almost disappearing on the anterior portion of the body. Along the sides, about half way down is a dull whitish line, and another of the same colour just above the stigmata or breathing holes, while close to the under surface the body is bordered with an irregular band of the same hue. On each side of the dorsal or central line above, is a small dark brown dot, on each ring or segment of the body. Stigmata nearly round and of a deep black colour.

The under surface is more transparent than the upper, especially on the anterior and terminal segments ; the colour is dull yellowish with a greenish tinge, from the internal organs showing through. The feet and legs are yellowish and semi-transparent.

In colour these caterpillars vary somewhat, some are of a deeper shade, becoming greenish brown, with the whitish lines fainter ; in these the green in the band down the back, can be seen alternately contracting and expanding when the larva is at rest, the greater transparency of the skin showing the working of the internal organs through it. Many of them died in confinement, and only six or seven completed their various stages, going into chrysalis early in July, and producing the moths late in August.

The chrysalis is about $\frac{1}{10}$ ths of an inch in length, and of a pale brown colour, and is contained in a little oval chamber or cell of earth a few inches below the surface.

The moth, when its wings are expanded measures about an inch and a half across. The fore wings are pale brownish, streaked and spotted with grey ; the hind wings are of a uniform pale brownish grey, with a white fringe around the margin. There is a whitish grey band across the front just behind the head, the anterior portion of the body is dark brownish grey, and the abdomen the same colour as the hind wings.

Experience seems to indicate that these insects are much more numerous in light sandy soils, than they are where the soil is heavier.

Remedies.—This is a very difficult insect to cope with. In all probability the moths which are attracted by light might be trapped, or poisoned by hanging about pieces of cloth or flannel daubed with a mixture of molasses and a strong solution of arsenic, but as they fly late in the season, when the sense of pressing danger is past, it would be difficult perhaps, to induce people generally to take much pains with them then. Hence the battle must be fought with this insect while in the larva or caterpillar state, and then the surest way of disposing of them is to catch and kill them. By searching around the vines just under the surface of the ground during the day, many may be turned up and destroyed, and by inspecting again at night when they are active and busy their ranks may be still further thinned, and by continuing this treatment, day after day, they may no doubt be kept under. Probably dusting the vines with hellebore would poison them as it does other leaf-feeding insects ; this measure is at least worthy of a trial.

8. THE MEASURING WORM (*Angerona crocotaria*, GUENEE).

Fig. 12.

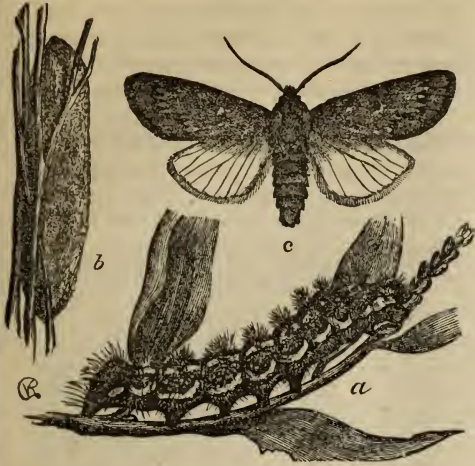


This larva, which was described in last year's report as injurious to the currant and gooseberry, has also been found attacking the strawberry. The caterpillar is yellowish-green, with longitudinal whitish lines, and is about an inch and a half long. The moth, see Fig. 12, varies in colour from a pale to a deep yellow, with dusky spots and dots, in some specimens few, in others quite numerous, and in the latter case the larger ones are so arranged as to form an imperfect band across the wings. For further details re-

pecting the life-history of this insect, the reader is referred to the report of the Entomological Society for 1872, page 37.

9. THE SMEARED DAGGER (*Acronycta obliquata*, Sm. and Abb.).

Fig. 13.



The accompanying figure illustrates this insect in its various stages. The larva is a brightly ornamented, hairy caterpillar, about one and a quarter inches long. Its head is flat in front, rather below medium size, with a few yellow hairs; its jaws are black.

The body above is of a deep velvety black, with a transverse row of prominences or tubercles on each segment, those above are bright red, and set in a band of the same colour, extending far down on each side. From each tubercle there arises a tuft of short stiff hairs, those on the upper part of the body being of a red colour, while below they become yellowish or mixed with yellow. On each side of a line drawn down the centre of the back, is a row of bright yellow spots, two or more on each segment, and below these and close to the under surface, is a bright yellow band deeply indented on each

segment, the indentations being on a line with the rows of tubercles. The spiracles or breathing holes are pure white, and are placed in the indented portions of the yellow band; there are also a few whitish dots scattered irregularly over the surface of the body.

The under side is dull reddish along the middle, and brownish black along the sides; the feet are of a shining black, and slightly hairy, while the thick fleshy hinder legs, called the prolegs, are reddish tipped with brown, with a cluster of short hairs on the outside of each.

This caterpillar is conspicuous from its beauty, and at first one can scarcely believe that such a handsome caterpillar could produce so plain and quiet looking a moth. Since this larva does not usually feed in company, but is scattered about singly, and as it is such a general feeder, there is no probability of its ever becoming very injurious, but its brilliant appearance is sure to attract the attention of every beholder. We have found it feeding very commonly on strawberry, also on raspberry, and occasionally on the Lombardy poplar. Mr. Riley has found it very common on smartweed, and a correspondent of his in Jefferson City, Mo., has found them very numerous on his peach trees, and has known them to denude both apple and willow trees.

As soon as this larva is full grown it draws together a few leaves or other loose material and constructs a rude case, within which it changes to a dark brown chrysalis. In this enclosure it remains a considerable time; those that we have bred have changed to chrysalis early in September, and did not produce the moths till June following. Mr. Riley says that in Missouri there are two broods each year, and it is possible they may be double-brooded with us also, in which case the summer brood must pass through the various stages of its existence in a much shorter time.

The moth, Fig. 13, c., is shown of the natural size. Its fore wings are grey, with a row of blackish dots along the hind border. There is a broken, blackish, zigzag line—sometimes indistinct—crossing the wing beyond the middle, and some darker greyish spots about the middle of the wings. The hind wings are nearly pure white.

In Mr. Riley's third "Report on the Insects of Missouri," he says, "there are at least three natural enemies which serve to keep this insect in check. The largest of these is the Uni-banded Ichneumon fly (*Ichneumon unifasciatus*, Say) a large black fly, 0.60 inch long, and characterized by a white annulus about the middle of the antennæ, a large white spot about the middle of the thorax, and a white band on the first joint of the abdomen."

"This fly oviposits in the larva of the Smeared Dagger, but the latter never suc-

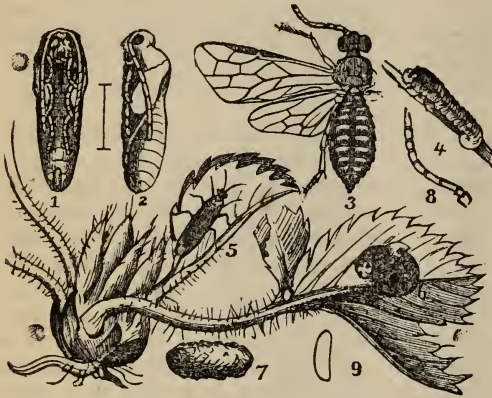
cumbs till after it has spun up and become a chrysalis, for I have always obtained the ichneumon from the chrysalis. The other parasites are smaller and work differently. They cause the larva of the Smeared Dagger to die when about full grown, and its contracted and hardened skin, which may often be seen during winter, with the head attached, fastened to the twigs of apple and willow trees, forms a snug little house, where the parasite undergoes his transformations, and through which it gnaws a round hole to escape the latter part of April. One of these flies (*Aleiodes Rileyi*, Cresson) is of a uniform reddish yellow colour. The other is a black fly of about the same size, but belonging to an entirely different genus, *Polysphincta*."

The only artificial remedy which has been recommended is that of hand-picking.

10. THE STRAWBERRY FALSEWORM, (*Empytus maculatus*, NORTON).

This insect, although it has not yet been observed in Canada, will very probably be with us before long. It has been common in the adjoining Western States for some time past, and as the perfect insect is winged, and during the hotter portion of the day quite active, and since the strawberry now is so widely cultivated, there is nothing to hinder the spread of this destructive insect, the habits of which it will be well for us to fully understand, so that we may know how to treat the enemy on its first appearance. We know that a near relative of this insect, the gooseberry saw-fly (*Nematus ventricosus*) has spread in a short time over a large section of our Province. Since we have had no personal experience with this foe to the strawberry grower, we shall avail ourselves of an excellent description of its life, history and habits, written by Mr. C. V. Riley, of St. Louis, Mo., and published in the first volume of the "American Entomologist," p. 90.

Fig. 14.



The adjoining Figure 14, drawn from nature by Mr. Riley, admirably illustrates this insect in its various stages. 1 shows the under side of the pupa or chrysalis. 2, a side view of the same. 3, an enlarged view of the perfect fly, showing the arrangement of the veins of its wings. 4, the larva or worm crawling. 5, the perfect fly of natural size. 6, the larva at rest. 7, the cocoon. 8, one of the antennae of the insect enlarged, showing the joints. 9, an enlarged egg of this insect. The fly belongs to the order *Hymenoptera*, and is known in popular language as one of the saw-flies. The larva is a soft dirty yellow worm, which feeds externally on the leaf of the strawberry. It is a little more than six-

tenths of an inch long when full grown. Its head is of a more decided yellow colour than the rest of its body, and usually has a dark brown spot above, one nearly of the same size at the upper front, and two rather smaller ones at each side, joined by a brown line. It has twenty-two legs.

"The parent flies may be seen hanging to and flying around strawberry vines about the beginning of May, in North Illinois, Iowa and Michigan, in all three of which States we know them to occur. They are dull and inactive in the cool of the morning and evening, and at these hours are seldom noticed. They are of a pitchy black colour, with two rows of large transverse dull whitish spots upon the abdomen. The female, with the saw-like instrument peculiar to the insects of the great family (*Tenthredinidae*) to which she belongs, deposits her eggs by a most curious and interesting process, in the stems of the plants, clinging the while to the hairy substance with which these stems are covered. The eggs are white, opaque and 0.03 of an inch long, and may be readily perceived upon splitting the stalk, though the outside orifice at which they were introduced is scarcely visible. They soon increase somewhat in bulk, causing a swelling of the stalk, and hatch in two weeks—more or less, according to the temperature—and from the mid-

dle of May to the beginning of June the worms attract attention by the innumerable small holes which they make in the leaves. The colours of these worms are dirty yellow and grey green, and when not feeding they rest on the under side of the leaf, curled up in a spiral manner, the tail occupying the centre, and fall to the ground on the slightest disturbance. After changing their skin four times they become full grown, when they measure about three fourths of an inch."

"At this season they descend into the ground, and form a very weak cocoon of earth, the inside being made smooth by a sort of gum. In this they soon change to pupæ, from which are produced a second brood of flies by the end of June or beginning of July. Under the influence of July weather the whole progress of egg depositing, &c., is rapidly repeated and the second brood of worms descend into the earth during the fore part of August, and form their cocoons, in which they remain in the caterpillar state through the fall, winter and early spring months, till the middle of April following, when they become pupæ and flies again, as related. This fly has received the name of *Emphytus Maculatus*, by Norton, in allusion, doubtless, to the whitish transverse lines on the abdomen."

"With the facts here given, it will be no difficult matter for anyone interested to make war in his own way. The worm's habit of falling to the ground enables us to destroy them with a solution of cresylic acid soap, or any other decoction, without necessarily sprinkling the vines; while knowing that they are in the earth during the fall and early spring, when there is no fruit, the ground may be stirred and poultry turned in with good advantage."

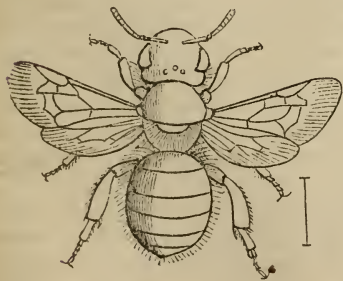
Doubtless, also, our well-known panacea for the gooseberry sawfly, powered hellebore mixed with water, would do as good service here as it is known to do with that pest, as they both belong to the same family and have similar habits.

[NOTE.—Since the above was in type, I have heard of the occurrence of this insect in Warwick, Ontario, and also in Brantford, Ontario, where they are said to be so numerous, that they soon strip a bed entirely of its foliage.]

11. OSMIA CANADENSIS—Cresson.

This is the name of a small hymenopterous insect, a sort of wild bee, which has proved destructive to the foliage of some strawberry plants during the past season, in the Township of Oxford. It was observed by Mr. Johnson Pettit, of Grimsby, who kindly furnished me with specimens of the insect. For the accompanying Figure 15, which represents the female, I am indebted to my esteemed friend, Mr. E. T. Cresson, of Philadelphia, who very kindly made the drawing from which the cut was engraved. I am also indebted to him for the determination of the species. Mr. Cresson first described this species in the *Proceedings of the Entomological Society of Philadelphia*, vol. 3, p. 33. In the figure the fly is represented on an enlarged scale: the hair line at the side shows its natural length. In both sexes, the head, thorax and abdomen is green and more or less densely covered with whitish down or short hairs, those on the thorax being longest. The wings are nearly transparent, with blackish veins. The female is larger than the male.

Mr. Pettit says, "The insects were taken in East Oxford, July 2nd, on a few strawberry plants in my brother's garden. The plants, perhaps nearly 100 in number, had been nearly all denuded of their leaves, and a search in the evening having failed to reveal the authors of the mischief, I examined them again in the heat of the day, and found the little culprits actively engaged in nibbling away the remaining shreds of the leaves. They appeared to chew the fragments into a pulp and carry it away, but the little time I spent in observing them was insufficient to determine anything further respecting their habits."



Doubtless in this instance the leaves so consumed were used in the construction of suitable nests, in which to deposit the eggs and rear the young of those insects.

A STRAWBERRY BUG (*Corimelaena*—?).

The insect above referred to belongs to an entirely different order from any of those already treated of, its place being among the *Hemiptera* or true bugs, but in its general appearance it very much resembles a small beetle, and indeed it is often mistaken for one. This bug is about one-tenth of an inch long, nearly round, and of a deep shining black colour. Its habit is to puncture the stem of the fruit and thus cause it to wither. In the *Canada Farmer* for 1837, page 328, and also in that for 1868, page 189, references are made to this insect, and it would seem that about that time it was very troublesome to the strawberries in the grounds of Mr. Chas. Arnold, of Paris, Ont., but it does not appear to have continued its devastations sufficiently since then to attract much attention. Mr. Riley refers to it as occurring in the west quite abundantly in some localities.—See *Amer. Entomologist*, vol. 1, page 207. Besides being injurious to the strawberry, it is said to have affected the raspberry, the cherry and the quince.

INSECTS AFFECTING THE HOP.

BY THE REV. C. J. S. BETHUNE, M.A.

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| <ol style="list-style-type: none"> 1. The Hop Aphis (<i>Aphis humuli</i>, Curtis). 2. The Hop-vine Snout-moth (<i>Hypona humuli</i>, Harris). 3. The Semicolon Butterfly (<i>Grapta interrogationis</i>, Godt). | <ol style="list-style-type: none"> 4. The Hop-vine Plusia (<i>Plusia balluca</i>, Geyer). 5. The Io Emperor Moth (<i>Hyperchiria varia</i> Walker). |
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The cultivation of the hop has never attained to any very large dimensions in Canada, though at times, when prices have been high, it has attracted no little attention amongst the farming community. Just now the acreage occupied by this plant in Ontario is probably considerably below what it was some four or five years ago, but even yet many a lovely trellised field may be seen here and there as one travels through the country. As, however, there is nothing in our climate or soil that is unsuited to the successful growth of the plant, we have little doubt that its culture will one day become an object of great and extended importance, unless, indeed, the Canadian entirely relinquishes his English taste for malt liquor in favour of the far more baneful spirits that are now a curse to so many. The present production of malt liquor in the Dominion of Canada averages nearly eight millions of gallons a year; in the manufacture of even this amount a very considerable quantity of hops is consumed, and if we add to it the quantity that is exported to England and the United States, it is apparent that the culture of this plant cannot be considered an unimportant item in the resources of the Canadian agriculturist. There is no doubt too, that if our hop growers paid more attention to the selection of the most approved English varieties for cultivation, and were more particular in regard to the picking and curing of their hops, they would be enabled to obtain much better prices for their crop, and would secure an unfailing market in Europe for all that might not be required here. But even should the hop, as is by no means likely, cease to be a sufficiently attractive article of commerce to lead our agriculturists to devote any of their broad acres to its cultivation, it will never fail, at least, to occupy a conspicuous place in the good wife's kitchen garden on account of its value in the production of yeast. Such being the case, then, we imagine that some account of the insects affecting this plant will not be out of place in these reports, and may prove of interest, and possibly of value, to many.

Before proceeding to the discussion of its insect enemies, we may remark that the common hop plant (*Humulus lupulus*, Linn.) is apparently indigenous to the western parts of this country as well as to Europe. We have seen it growing in great luxuriance and gathered sprays of its clustering flowers on the fertile banks of the Kaministiquia River, a few miles above Fort William, Lake Superior. It is said also to be found in a wild state on the borders of the Mississippi and Missouri rivers. The hops of commerce consist of the female flowers or seeds—the plant being dioecious *i.e.* with stamens and pistils in separate flowers on different individuals. The male flowers are very different in

appearance from the female, and are grown in hop yards at about the rate of six plants to an acre, for the purpose of fertilizing and maturing the hop blossoms.

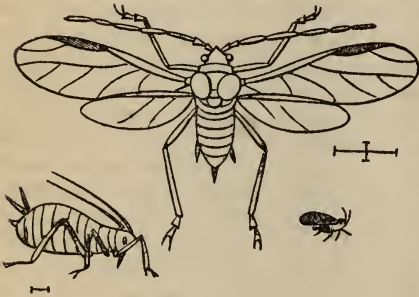
THE HOP APHIS (*Aphis humuli*, Curtis).

1. HEMIPTERA HOMOPTERA—APHIDÆ.

It would almost appear as if no catalogue affecting any particular plant could be complete without referring to some species of Aphis, or Plant-louse, so ubiquitous and destructive are these tiny creatures. We have already noticed in these reports* the particular species that infest the apple and the wheat, and have recounted the damage that they oftentimes inflict. But when we come to the Hop we find that the Aphis, or "Fly" as it is termed in England, is, *par excellence*, its greatest enemy, and that the profits of the grower depends very largely upon the presence or absence of the hordes of this minute foe. As Kirby and Spence so strongly state, "the hop-grower is wholly at the mercy of these insects; they are the barometer that indicates the rise and fall of his wealth, as well as of a very important branch of the revenue—the difference in the amount of the duty on hops (in England, being often as much as £200,000 per annum, more or less, in proportion as the *Fly* prevails or the contrary." In this Province we have seen the produce of a field of many acres almost utterly ruined by this insect—the amount of hops produced being diminished more than one-half below the average, and the quality of that which was gathered very much impaired.

The Hop Aphis resembles very closely in size and appearance the species that infest many other plants. As we have already described similar species in these Reports (1st Report, p. 77; 2nd Report, p. 57), we need do no more than state that the enemy of the Hop is green in colour, and about one-tenth of an inch in length when fully grown. The accompanying illustrations display the shape and structure of the creature. Fig. 16

Fig. 16



represents a highly magnified winged male above; below it, on the right hand side, a male of the natural size, and on the left a magnified female. Fig. 17 represents a female on a very much larger scale. Notwithstanding the similarity in colour which exists between these

Fig. 17.



insects and the leaves and stems of the Hop-plant, their presence may be immediately detected by the blackish discolouration of the leaves below where they are at work. This is caused by the continual exudation from the insects of a sweetish fluid called "honey-dew," which is emitted from the two processes that project from each side of the extremity of the abdomen. As we have remarked on a previous occasion, many insects, and especially ants, are very fond of feeding upon this sweet substance; the latter even go so far as to perform upon the Aphis an operation analogous to that of milking a cow, for the purpose of obtaining this sweet fluid. And not content with this, some species of ants make a property of these Aphis cows, jealously guarding them, and using every means to keep them to themselves. As related by Kirby and Spence: "Sometimes they seem to claim a right to the Aphides that inhabit the branches of a tree or the stalks of a plant and if stranger ants attempt to share their treasure with them, they endeavour to drive them away, and may be seen running about in a great bustle, and exhibiting

* First Annual Report—Insects affecting the apple, p. 77; Second do—Insects affecting the wheat crops, p. 57.

every symptom of inquietude and anger. Sometimes, to rescue them from their rivals, they take their Aphides in their mouth; they generally keep guard round them, and when the branch is conveniently situated, they have recourse to an expedient still more effectual to keep off interlopers. They inclose it in a tube of earth or other material, and thus confine them in a kind of paddock near their nest, and often communicating with it."

Another curious and noteworthy fact in the history of Aphides is their occasional migration from one place to another in enormous swarms. Nearly a century ago Gilbert White observed at Selborne, in Hampshire, a shower of Aphides, which covered persons walking in the street, hedges, garden plants, and everything else that came in their way; he considered that they were borne by the east wind from the great hop fields of Kent and Sussex. Kirby and Spence mention similar swarms in the vicinity of Ipswich in 1814, and at Hull in 1836. To come to later times, Mr. Knaggs relates (*Entomologists' Monthly Magazine*, No. 5, p. 123) that on the 14th of July, 1864, "whilst walking along the beach from Bournemouth towards Poole, a strange mossy-looking, green track, which varied in width from one to three or four inches, arrested my attention; this moss-like line, left at high-water mark by the tide, extended, so far as my observation went, for a mile, though probably to a far greater length, and consisted of millions upon millions of Aphides." The following year, it is stated by Mr. Haswell (*Ent. Mag.*, No. 18, p. 142) that the Aphides were a perfect pest in Edinburgh and other parts of Scotland in September and October; they swarmed over everything even in the streets of cities, and to such an extent that "they rendered one very uncomfortable by their numbers, especially when they got into one's mouth or eyes!"

The numbers and devastating powers of the Hop Aphis being so great, it becomes necessary oftentimes to apply some artificial remedy in order to save the crop from entire destruction. In parts of England where the labour of women and children can be obtained at a cheap rate, it has been recommended to clear the plants of insects by hand; but any such mode of dealing with them is quite out of the question in Canada. We must then have recourse to some other expedients. The following we believe to be the most efficacious:

(1.) Make a mixture of strong soap-suds; add to it salt and saltpetre till a brine is made about half as strong as ordinary beef pickle; add further a pound of copperas dissolved in warm water to every five gallons of liquid. Or

(2.) Make a strong decoction of tobacco by boiling at the rate of a pound of stems and refuse parts, or other cheap tobacco, to a gallon of water.

As soon as the insects are observed on the vines (or *bines*, as hop-growers term them,) they may be at once detected by the discolouration that we have referred to above. Go through the rows with a supply of either of these mixtures, and sprinkle them thoroughly with it. As the insects are for the most part congregated on the under side of the leaves, it is necessary to use a strong syringe, or better, a small garden engine with a rose-nozzle attached, and squirt the liquid upon the insects from beneath. Constant watchfulness and a diligent application of these means will keep a hop-yard clear of these insects, without incurring any very great expense. The modern system of training the vines upon horizontal trellises, instead of long poles, renders easy the successful employment of this method.

Another remedy that has been highly spoken of is the dusting of the affected plants with powdered plaster, which not only kills the Aphis, but is of benefit to the soil as well. Instead of plaster, sulphur, or lime may be employed with advantage, the former being especially useful also as a preventative for mildew.

In addition to the use of the artificial remedies just referred to, much benefit may be derived from the encouragement of various insects that prey almost exclusively upon the various species of Aphis. As we have before stated, when giving an account of the enemies of the Grain Plant Louse (*2nd Report*, p. 58), "the most common and useful are the different species of Lady-birds (Fig. 18); the Lace-wing Flies (*Chrysopa*), both in their perfect state (Fig. 19), and in their larval condition (Fig. 20);



FIG. 18.

the Syrphus Flies in their larval state (Fig. 21); Fig. 22 represents a winged Syrphus Fly; Dragon Flies, &c.; all of which should be heartily encouraged by the husbandman."

It is a singular fact that the Lady-birds (*Coccinellidæ*), the first mentioned of the foes of the Aphis, occurs at times in immense swarms, like those of its prey to which we have already referred. Vast numbers of these little beetles are sometimes found on the shores of lakes



FIG. 20.



FIG. 21.



FIG. 22.



and rivers, and along the sea coast. Kirby and Spence state that "many years ago the banks of the Humber in England were so thickly strewn with the common Lady-bird, that it was difficult to avoid treading upon them." On another occasion they were observed in vast numbers on the sand-hills of the sea shore in Norfolk; again they covered the cliffs of Kent and Sussex, "to the no small alarm of the superstitious, who thought them forerunners of some direful evil!" In the summer of 1870, they were observed in various parts of England in countless numbers, while some other places were visited by swarms of Syrphus Flies—another enemy to the Aphis. The sudden appearance of all these creatures is accounted for by the supposition that the simultaneous hatching of a large number in one locality caused a scarcity of food there, and compelled many of them to move elsewhere. On coming to some obstruction, such as the sea, they would accumulate in masses and so attract general attention. In *Newman's Entomologist* (No. 73, p. 16), it is stated that during the prevalence of the swarms of Lady-birds in 1870, "Mr. Jansen had an apple tree completely covered with black aphides, the whole of which were cleared off in three or four days by *Coccinella septempunctata*."

We trust that all who read these Reports,—farmers, gardeners, and hop-growers especially—will make it a rule never to destroy any of these most useful little creatures, and will also impress upon all connected with them the importance of following their example in this respect.

2. THE HOP-VINE SNOUT-MOTH (*Hypona humuli*, HARRIS).

LEPIDOPTERA PYRALIDÆ.

Next in destructiveness to the Hop-aphis comes, in this country, the Snout-moth; at times, indeed, it more than rivals in its injuries the other noxious insect. In the month of June, earlier or later according to the season, the Hop-grower may frequently observe the leaves of many of his vines riddled with holes, or eaten down to the ribs. On inspection, he finds a small caterpillar at work, pale green in colour, with a dark, almost blackish longitudinal stripe on the back, and two narrow white lines on each side. Sometimes these lines are wanting. The body is long and slender, with its wings or segments very prominent; each segment is furnished with two transverse rows of black dots, from each of which proceeds a short hair. The head is rather deeply divided into two lobes, and is covered with similar dots and hairs; the mouth is yellowish, with the jaws tipped with black. Unlike the majority of caterpillars, this creature is furnished with only seven instead of eight pairs of legs, being destitute of the first pair of pro-legs beneath the middle of the body. The result of this deficiency is that the caterpillar is obliged to loop itself up to a slight extent when crawling, though not to the same degree as the Geometer or measuring worms, (*Geometridæ*). When fully grown it is over half an inch in length. It is a particularly active creature, and when disturbed jerks its body from side to side, and leaps from one spot to another; it is also able to let itself down

from its leaf by a fine silken thread. After it has attained to maturity it descends to the ground, and crawling into any crevice or other place of concealment, forms a slight silken cocoon and changes into the chrysalis state. In this condition it remains for a fortnight

FIG 23.



or three weeks, and then comes forth at the end of June or early in July as a dusky brown moth, measuring an inch and a quarter across its expanded wings. The forewings are marbled with gray beyond the middle, and have a distinct gray spot on the tip; they are crossed by two wavy blackish

lines, one near the middle and the other near the outer hind margin. These lines are formed by little elevated black tufts, and there are also two similar tufts on the middle of the wing. The hind wings are dusky brown or light brown, with a pale fringe, and are without bands or spots."—(Harris). A peculiarity of the insect, from which it derives its common name of "Snout-Moth," is that it has a pair of very long and slender compressed palpi or feelers, which project from the head in the form of a snout. The accompanying wood-cut (Fig. 23) represents the creature in all its stages. There are two broods in the year; the caterpillars of the second appear in July and August, and attain to the imago state in September.

This insect is rather variable in its appearance, but is oftentimes excessively destructive. In 1869 we observed two Hop-yards in the County of Peel almost ruined by it, while in the preceding and succeeding years no great number of the caterpillars was to be seen. Dr. Fitch considers it "the most universal and formidable of the depredators of the Hop, making its appearance suddenly, in a few days sometimes, and before their presence is noticed completely riddling and destroying the leaves of whole fields." In Europe there is a similar insect, termed the Beaked Snout-Moth (*Hypena Rostralis*, Linn), which may be identical with our species; probably, indeed, our insect, like so many of our greatest pests, has been introduced from the other side of the Atlantic.

The most approved remedy for the insect is to drench the vines with strong soap-suds. To shower them with powdered white hellebore mixed in water—an ounce of the drug to a pailful of water—would, we should think, be even more effective. Much might also be done by jarring the poles among which the Hops are entwined, and crushing under foot all the caterpillars that fall to the ground.

3. THE SEMICOLON BUTTERFLY. (*Grapta interrogationis*, GODT.)

LEPIDOPTERA—NYMPHALIDÆ.

The two species already described are by far the worst insect enemies that the hop-grower has to deal with. The others to which we now desire to draw attention are seldom found in sufficiently large numbers to cause much alarm, though at times their depredations are somewhat serious, especially when they attack a few hop-vines in a garden.

The species before us, the Semicolon Butterfly (*Grapta interrogationis*, Godt), is a large handsome insect, with wings above of a tawny orange colour, spotted with black and brown; beneath, the wings are in some specimens rusty red, in others marbled with red and brown tints; in the middle of the underside of the hind wings there is a conspicuous silvery mark, shaped like a small semicolon (;), from which the species derives its name. The modern semicolon is employed in the Greek language as the mark of interrogation; hence both common and technical specific names have the same meaning and refer to the same characteristic. The wings of this butterfly measure, when expanded, as much as two and a half to three inches. There are two broods of them in the year, the first late in June, the other in August.

The larva feeds upon the leaves of the elm and basswood, as well as upon the hop. When partially grown, in the early part of August, it is thus described by our friend Mr. Saunders:—"Length, half an inch. Head black; body above, black, with transverse

rows of branching spines, those on the third, fourth, and terminal segments black, with a row of the same colour along each side, close to the under-surface; all the other spines pale whitish. Under-surface nearly black, with dots of a pale hue." When fully grown, and an inch and a quarter in length, Mr. Saunders describes it as follows:—"Head reddish black, flat in front, somewhat bilobed, each lobe tipped with a tubercle, emitting five simple black pointed spines; head covered with many small white tubercles mixed with a few blackish ones. Body above, black, thickly covered with streaks and dots of yellowish white. All the segments, except the second, with either four or seven branching spines yellow with blackish branches. Under surface, yellowish grey; feet, black and shining; pro-legs, dull reddish."

The chrysalis is ashy-brown in colour, with the head deeply notched, and surmounted by two projections resembling ears; on the thorax is a long, nose-like prominence, giving the creature the appearance of a grotesque mask; and on the back are eight silvery spots. It is suspended by the tail, frequently under the leaves of the plant, at other times under any convenient projection. In this state the insect remains from twelve to fourteen days; the later brood usually somewhat longer.

This insect is greatly kept in check by a minute parasite belonging to the family of Ichneumons; it is called by Dr. Harris the *Pteromalus Vanessæ*. We have oftentimes been disappointed in our attempt to raise the butterfly of this species by this little fly. Everything apparently goes on well, and the caterpillar assumes the chrysalis state, but by-and-by, instead of a butterfly, out comes, through a hole in the side, a swarm of tiny flies. If it were not for these creatures the caterpillar would soon become a most formidable and destructive pest.

FIG. 24.



There are two other species of American Butterflies, whose larvæ feed upon the hop; one, not uncommon in Canada, the Comma Butterfly (*Grapta Comma*, Harris), is like the preceding species, in general-appearance and habits; instead of a semi-colon, it has a silvery comma on the middle of the hind-wings beneath.

Fig. 24 represents this butterfly.

The caterpillar feeds also upon the currant and elm. The other species is the Hop vine Thecla (*Thecla humuli*, Harris; *melinus*, Hubner). It ranges

from the New England States to Texas and California, but we are not aware that it has yet been taken in Canada.

4. THE HOP-VINE PLUSIA (*Plusia balluca*, GEYER).

LEPIDOPTERA-PLUSIDÆ.

The larva of this very handsome moth feeds upon the hop, and is occasionally found in some numbers; seldom, if ever, however, is it so numerous as to become a source of serious trouble. It is essentially a Canadian insect, being but very rarely observed to the south of us.

The larva was found by Mr. W. Saunders, of London, Ontario, on the 13th of June, 1872, and is thus described by him in the January No. (1873) of the *Canadian Entomologist*:-

"Length, 1·20 inch. Body, thickest on middle, and posterior segments tapering towards the front; the body is arched or looped along the middle segments, when in motion.

"Head rather small, bilobed, of a shining green colour, with a few whitish hairs.

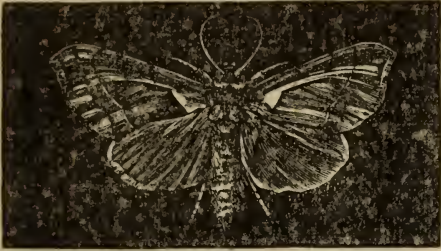
"Body above yellowish green, streaked and spotted with white, intermixed all through with green, thus dividing the white into a series of streaks, dots, and broken lines; there is also a line of greenish white on each side, close to the under surface. Each segment has a few tubercles of a green colour, striped with white; these are small on the 2nd, 3rd, and 4th segments, but much larger from 5th to 12th inclusive, and entirely wanting on the terminal segment. On each of the hinder segments, with the exception of the last,

there are ten or twelve of these tubercles, which almost cover the whole surface, and from each of the tubercles throughout there arises a single whitish hair.

"The under surface is of a deeper green than the upper, with a few short whitish hairs, chiefly on 5th, 6th, 7th, 8th, 11th and 12th segments; feet, green; pro-legs, of which there are three pairs, green also.

"This larva became a chrysalis on the 18th of June, and produced the moth on the 13th of July."

FIG. 25.



Province.

As this species is seldom numerous, it is unnecessary to suggest any remedy. In all probability its numbers are prevented from becoming excessive by some insect parasite.

The Moth (Fig. 25), into which this caterpillar turns is a remarkably handsome creature; the fore-wings are almost entirely covered with brilliant metallic green scales, darker below the middle, and paler towards the inner angle; they are crossed by two oblique dark lines. The hind-wings are a dusky grey, without markings. The wings expand about an inch and three quarters. We have usually taken the moth in the month of August, and have found it in various parts of this

5. THE IO EMPEROR MOTH (*Hyperchiria varia*, WALKER).

LEPIDOPTERA-SATURNIADÆ.

Besides the foregoing, there are two other insects that affect the hop-vine, respecting which we would say a few words before leaving this subject. One of these is so very general a feeder that it can hardly be termed a Hop insect; it is the larva of what is commonly known as the Io Emperor-Moth, of Harris (*Hyperchiria varia*, Walker). It feeds indiscriminately upon the leaves of willow, elm, white poplar, cornel, sassafras, cherry and locust, as well as the Hop; it is even said to eat clover and the leaves of Indian corn. When first hatched out, the caterpillars are dark brown, and covered with bristles; later on, when about a third of an inch in length, their general colour is black, the body being entirely covered with long sharp branching spines, and having two reddish white lines along the sides. When fully grown, they attain to a length of two and a half inches, and are of a delicate yellowish green colour, with a reddish lateral band, not extending the whole length of the body towards the head; the spines are then of a pale yellowish green colour, and have an irritating property, like that of the stinging nettle. Specimens that we have reared formed their cocoons in September, and appeared in the perfect state in the following June. The Moth varies very much in the two sexes, but both are remarkably handsome. The male is of a deep yellow colour, with a few darker lines across the fore-wings; the hind-wings are broadly bordered with purplish red next to the body, and have in the middle of each a large and beautiful eye-like blue spot. The female, which is usually larger, has its fore-wings, of a purplish brown colour, with grey transverse lines, and its hind-wings coloured like the male, and with a still larger eye-like spot.

The insect is quite common throughout Canada and the Northern States, but never so numerous as to be considered destructive. The Moth is one of our most beautiful species.

One other insect, to which we just now referred, is one of which we do not know the name, as we have only seen it in its larval state.

On the 27th of June, 1868, about a pint of larvæ were sent us by Mr. Wm. Magrath, of Erindale, Credit, which he had taken from the roots of his hop-plants. They fed upon the crown of the root, at its junction with the stem, and ate out a roundish cavity in it;

two or three often worked together at the same root. We endeavoured to rear them to the perfect state, but did not succeed, and have never had an opportunity since. We give a full description of the larva taken at the time, in the hope that some of our readers may be able to identify it.

Length, 1.25 to 1.50 inch. Ground-colour, dirty white ; head, chestnut-colour ; mandibles, black. Body, with a pale narrow dorsal line ; first segment above, with a glassy shield-like patch, dirty yellow, with a black edge in front ; below this, on each side and above the first pair of legs, two black shining dots, the anterior one larger than the other, which contains the spiracle. On each side of the dorsal line, a dusky lilac stripe ; and on each segment a darker flat wart in front, and a blackish dot behind, on the lower side of the stripe. Next, a pale line, broader than the dorsal line ; a lilac line of the same width ; another pale line ; a lilac tubercled stripe, having on each segment a black-tipped wart in the middle above, a tiny black dot lower down, behind it the shining black spiracle, and then another black-tipped wart ; next, a pale stripe, with a black wart on each segment, except the first and the tenth, which have each two small warts ; below this another faint lilac stripe, along the top of the pro-legs. The anal segment shining black above, white elsewhere ; and pro-legs blackish exteriorly. From each of the warts alluded to there proceeds a single dark bristle. The larva has its full complement of sixteen legs.

The more mature specimens have the lilac stripes more obscure, and the black warts, therefore, more conspicuous ; while the less mature specimens have the lilac stripes much more developed and spot-like on the segments, rendering the black warts much less apparent.

INSECTS INFESTING MAPLE TREES.

BY E. B. REED, LONDON, ONT.

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| <ol style="list-style-type: none"> 1. The Maple Borer or Beautiful Clytus (<i>Clytus speciosus</i>, Say). 2. The Rosy Forest Caterpillar (<i>Dryocampa rubicunda</i>, Fab.) 3. The American Silkworm (<i>Telea polyphemus</i>, Linn.). 4. The Cecropia Emperor Caterpillar (<i>Platysamia cecropia</i>, Linn.). | <ol style="list-style-type: none"> 5. The Maple Owlet Moth (<i>Apatela Americana</i>, Harr.). 6. The Banded Maple Moth (<i>Ophiusa bistriaris</i>, Hubner). 7. The Maple Leaf Cutter (<i>Ornix acerifoliella</i>, Fitch). 8. The Maple Measuring Worm (<i>Stegania pustularia</i>, Guénee). |
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The cultivation and protection of our forest trees is a subject which is, as each succeeding year rolls by, being slowly but forcibly brought to the notice of our Canadian agriculturists.

The rapid destruction of timber trees for fuel and building purposes, and the very evident effect that is being gradually produced on our climate and soil, added to the lessons that experience in other countries affords, ought certainly to attract the attention of every well-wisher to our future prosperity. Whilst the forests of Canada are justly a source of much pride and material wealth to the community, the Maples amongst all our native trees are perhaps the best known and the most highly and widely esteemed.

Admirably adapted for shade and ornamentation, whether for garden, park, or field, most excellent for fuel, exceedingly beautiful when worked up by the cabinet maker, and especially valuable for their saccharine matter, the Maples surely stand preëminent among our native Canadian forests.

It is, therefore, very desirable that we should examine and learn something of the habits and history of any insects whose depredations would affect the growth or well-being of these beautiful trees.

1. THE MAPLE BORER (*Clytus speciosus*, Say).

Order, COLEOPTERA ; Family, CERAMBYCIDÆ.

This destructive insect belongs to a family of beetles known as the Long-horns or Capricorns, the grubs or larvæ of which are all *borers*, penetrating with ease the hardest timber, and causing immense devastation amongst the respective trees which they severally affect.

In consequence of their habits, which are exceedingly varied, the proceedings of the larvæ are difficult of observation, some living altogether in the main trunk of trees, while others attack the branches only, some devouring the wood, others the pith.

The number of species in this family is very large, and there is hardly a single kind of tree that is exempt from the attacks of one or other of these Borers.

The Maple Borer or *Clytus speciosus* was first observed and described in its beetle state by Mr. Thomas Say, in 1824. It is a very beautiful insect, and may readily be distinguished by its brilliant black and yellow colours, giving it much the appearance of

a large hornet, so much so, indeed, that very few persons except Entomologists would at first sight care to touch it. In England there is a similar but smaller beetle, *Clytus arietis*, popularly known as the Wasp beetle, a member of the same family as our Maple Borer. The latter, when arrived at its perfect state (See Fig. 26), varies from 9 to 12 tenths of an inch in length, and from 3 to 5 tenths in width. The head is yellow and furnished with powerful mandibles or jaws; the eyes and a band above them extending across the head are black; the antennæ or horns are also black, and are curved somewhat after the fashion of those of a goat, a similarity which gave rise to their general name of *Capricorns* or goat-horns. The thorax is deep black, with two yellow oblique stripes on each side; it is very large, somewhat globular, and flattened or depressed above. The body is deep black, oblong, somewhat cylindrical, a little flattened above, and tapering behind. The elytra or wing covers have yellow bands, the first of which forms a regular arch, of which the keystone is composed of the yellow scutell or little shield-shaped spot at the top of the wings, just behind the centre of the thorax; the second band is in the form of the letter W, each V receiving a termination of the first band; the third band is nearly transverse, and placed across the middle; the fourth is bent obliquely backward, parallel with and near to a large terminal spot or band, which latter has a large black central spot on each wing case.



FIG. 26.

Colours—Yellow & black.

The elytra are each tipped with a short blunt tooth. The legs are long and yellow, with a brown line on the inner side of the thighs; they are made for standing securely, being very broad, and with the third joint deeply notched. The underside of the abdomen is reddish-yellow, variegated with brown. Figure 26 represents the male. The female is larger and stouter than the male, and has rather shorter antennæ. She may also be easily distinguished by having a jointed tube at the end of the abdomen, which is capable of being extended or contracted at will, and is used for the purpose of conveying the eggs into the crevices or holes of the bark of the trees. These insects emit a shrill, screeching noise on being handled or disturbed. This noise is caused by rubbing the joints of the thorax and abdomen together.

The beetles may generally be seen reposing quietly on the trunks of the trees during the day time, as they are more active at night, which period they select for their excursions in search of their mates. According to Mr. Harris, the beetle lays its eggs on the trunk of the maple in the months of July and August.

The larvæ hatched from these eggs are long, whitish, fleshy grubs, with deeply marked transverse incisions on the body. Their legs, which are six in number, are only rudimentary and are of no service in locomotion; it is by means of the alternate contraction and extension of the rings or segments of the body that these little creatures force their way through the wooden tunnels in which they live, and in order to further assist their progress each segment is furnished with fleshy tubercles capable of protusion, and which, being pressed against the sides of their retreats, enable them to thrust forward by degrees the other segments. As the grub has to feed upon very hard material it is provided with strong horny jaws, and the head, which is slightly bent downwards, is also covered with a strong horny skin. The grubs penetrate the bark, under which they lie dormant during the winter, and in the succeeding spring and summer they pierce further in, running long winding galleries up and down the trunk. The larvæ probably remain more than one year in this condition and then change into pupæ, in which state they are at first whitish and very soft, but gradually harden and darken until the time arrives when the beetle is perfectly matured, and forcing a passage through the outer bark, near which it has instinctively eaten its way whilst yet a grub, emerges into the open air.

Although the attacks of these beetles are not as yet of any great extent, still in some localities they have done a good deal of harm. In and near London, especially, we are aware of many fine and valuable maples, chiefly the hard or sugar maple, *Acer saccharinum*, that are being gradually destroyed by the operations of these insects. Their attacks can readily be detected by the sawdust and exuviae that they cast out of their burrows, and in the spring, whilst still near the surface, it is quite possible to kill them by means of a stout piece of wire, or the judicious use of a good sharp knife.

2. THE ROSY FOREST CATERPILLAR (*Dryocampa rubicunda*, Fab.)

Order, LEPIDOPTERA ; Family, DRYOCAMPA.

The last described insect, as we have seen, attacked the wood only of the trees, but the insects we are about to treat of devour the leaves, and by their attacks on the young buds materially affect the growth of the young maples.

The name *Dryocampa*, signifying oak or forest caterpillar, was originally applied by the late Dr. Harris, the talented Entomologist of the State of Massachusetts, to certain insects found sometimes in great numbers on oak trees, and of which one species, *Dryocampa senatoria* is exceedingly common in the larval state. The Ruby Forest Caterpillar, however, is generally found on the silver maple, *acer dasycarpum*, or the swamp maple, *acer rubrum*.

The caterpillars are hatched about the month of July, and their presence may often be detected by their droppings on the ground beneath the trees, although it is not always easy to discover the insect itself. Mr. William Saunders has bred the moth from the larva, and we therefore avail ourselves of his description published in the *Canadian Entomologist*, Vol. II., page 75.

The larva when full grown is about one inch and three quarters long. The head is rather small, flattened and bilobed in front, of a pale orange colour, and having a black dot on each side below, near the mandibles or jaws. The body above is yellowish white, with a stripe of rather indistinct pale green on the back, and three stripes of the same hue on each side. The third segment has two black horns fully one tenth of an inch long, one on each side of the dorsal stripe, and spreading outwards. On each segment are several black dots or tubercles, those on the twelfth and thirteenth segments being the most distinct. On the sides of the posterior segments is a pale reddish, orange patch, nearly the colour of the head. The under surface is deep, glossy green, with a faint whitish line down the middle, and many small blackish dots or tubercles. The feet are pale reddish ; the pro-legs pale green, dotted with black.

The larvæ having arrived at maturity seek shelter in the ground, and there undergo their transformation into the pupal state, remaining thus all the winter and spring, and emerging as perfect moths the following summer. The method by which the apparently inanimate pupa effects its escape has been well described by Dr. Harris in writing of a very similar insect—the *Dryocampa imperialis*: “The Chrysalis is rough with little elevated points, particularly on the anterior extremity, and ends behind with a long forked spine, and is surrounded on each ring with a notched ridge, the little teeth of which point towards the tail. Three of the grooves or incisions between the rings are very deep, thus allowing a great extent of motion to the joints, and these with the notched ridges and the long spine at the end of the body, enable the chrysalis to work its way upwards in the earth above the surface of which it pushes the fore part of its body just before the moth makes its escape.”

Fig. 27.



Colours—Pale yellow and rose.

The perfect insect, of which Fig. 27 represents the male, is a very beautiful and delicately coloured creature. The forewings are rose coloured crossed by a broad pale yellow band ; the hind wings are pale yellow with a short rosy band behind the middle, this in some specimens especially males is wanting ; the body is yellow ; the abdomen and legs are rose coloured. The male expands about one inch and three quarters, while the female reaches fully two inches, the body of the male does not extend beyond the hind wings as does that of the female. The antennæ of the latter are simple and thread like in form while those of the male, as will be seen on referring to the figure, are deeply pectinated or comb shaped to much beyond half their length, and minutely serrated or saw-shaped from thence to the tips. Dr. Harris conjectured that sometimes two broods might occur in the season ; as in 1842, he captured specimens of the larvæ in July which produced the moth in August, and in September following, he took many more caterpillars. He, however, accounted for this on the ground, “that all insects have their periods of increased numbers which in some instances may be unfixed

and irregular, but in others their periods of numbers are as fixed and regular as that of the seventeen year locust.

For young trees which are easily accessible the caterpillars may be collected by hand and destroyed.

As the moths, being night fliers, are not very often seen, it might be a good idea to try the entomologist's plan for collecting moths viz : Placing a piece of rag saturated with sugar at night on the trunk of the tree, and visiting it occasionally with a lantern, and capturing with a net any of the moths that are sure to be found feeding on the attractive sweets.

3. THE AMERICAN SILK WORM (*Teia Polyphemus*, Linn.)

Order, LEPIDOPTERA ; Family, BOMBYCIDÆ.

Fig. 28.

Female.



Fig. 29.

Male.



Colours—Dull ochre yellow—purplish bands and eyes.

This magnificent insect belongs to the same Family as the well known Chinese Silk Worm, *Bombyx mori*. It has received the especial name of THE American Silk Worm, because for all practical purposes it is the only American silk-spinner now known that can be rendered of any commercial value. For many years *Sericulture* or the art of raising silk producing insects, has been very seriously threatened with great loss if not entire destruction by the various epidemic diseases that affect the Mulberry silk-worm. Much attention has therefore been paid lately towards acclimatizing in Europe and elsewhere, other silk producing Bombyces in order to supersede if necessary the mulberry species. *Telea Polyphemus* being found easy of propagation, its whole history is well known and we, therefore, purpose to give our readers a detailed account of its various transformations, the more especially as it is a tolerably common insect and from its size and splendid appearance both as larva and moth, it is sure to attract attention and excite the curiosity of those who see it. Hitherto it has been supposed to feed only on oak, and those who have bred it in large numbers for the silk market have raised it exclusively on oak leaves, but it, nevertheless, frequently attacks the maples and from the enormous size of the caterpillar and its voracious appetite, a great deal of damage is often done. Figures 28, 29 are admirable illustrations of the perfect moth, male and female. Dr. Harris thus describes its appearance: "Its wings are cut off almost square at the corners. It is of a dull ochre-yellow colour more or less clouded with black in the middle of the wings, on each of which there is a transparent eye-like spot, divided transversely by a slender line, and encircled by yellow and black rings; before and adjoining to the eye spot of the hind wings is a large blue spot shading into black; near the hinder margin of the wings is a dusky band edged with reddish white behind; on the front margin of the fore wings is a gray stripe which also crosses the fore part of the thorax, and near the base of the same wings are two short red lines edged with white." On the under side the colours are paler, but the bands are more distinct. The antennæ are broad especially in the male and deeply pectinated. The wings expand from five to six inches. When at rest the wings are held elevated above the body like those of a butterfly, but if disturbed they are spread out flat, both pairs being displayed. The moth usually flies towards dusk or in the early part of the evening. The moths make their first appearance about the month of June. The female lays a large number of eggs; she deposits them on the underside of the leaves leaving but a single egg in each place.

Mr. L. Trouvelot, in an admirable article in the *American Naturalist*, has given a very interesting account of his success in raising large broods of these caterpillars, having had in 1865, five acres of woodland swarming with insect life, numbering not less than a million. According to him "the incubation of the egg lasts from ten to twelve days." The caterpillar eats its way out of the egg, the shell of which it devours. The Larva (Fig 30) attains its maturity in about 70 days, having changed its skin five times during that period.

FIG. 30.



Colour—Pale, bluish green—orange spots.

It is about three inches in length, though it has a peculiar fashion of contracting its body, and hunching up its segments, when not in motion. Its colour is pale bluish green. The segments are covered with orange or reddish warts, or tubercles which have a pearly lustre, and are furnished at their extremities with a few hairs. The head and feet are brown, and the tail or anal segment is bordered with a brown V-shaped line. The sides of the body are striped obliquely with white.

The cocoon, (Fig 31) which is of a regular oval shape and about two inches long, is formed

FIG. 31.



coon. The silk of which the inner one is formed is very glossy, rather coarser than that of *Brombyx mori*, and according to M. Trouvelot, can be used very extensively in commerce. It has a continuous thread and can be readily unwound. We are not aware what the actual length of the silk in each cocoon amounts to, but it must be something very great, if one may judge it by comparison with that of the Chinese silk worm. Rennie, in his *Insect Architecture*, in speaking of the latter states, "that the length of the unbroken thread in a cocoon varies from six hundred to a thousand feet; and as it is all spun double by the insect, it will amount to nearly two thousand feet of silk, the whole of which does not weigh above three grains and-a-half; five pounds of silk from ten thousand cocoons is considerably above the average." When we see the enormous difference in size between the cocoons of *Polyphemus* and *mori*, we can well believe that it may be very advantageous to the silk grower, to do all he can towards developing the experiments already made in the culture of our American silk worm. We must not forget, however, that amongst our ornamental and forest trees the larva is capable of doing much harm, and in the present instance we can only regard it as a noxious insect, and therefore one to be destroyed. Like everything else in the insect world, it has its special enemies, being very subject to the attacks of an Ichneumon fly, named *Ophion Macrurum*. Hand picking is the only remedy we are aware of.

FIG. 32.



4. THE CECROPIA EMPEROR CATERPILLAR. (*Platysamia cecropia*, Linn.)

Order, LEPIDOPTERA; Family BOMBYCIDÆ.

This insect was fully described by the Rev. Mr. Bethune, in his treatise on insects injurious to the Apple, contained in the Commissioner's Report for 1870, to which we refer our readers for further details. As the caterpillar feeds also on maple leaves we have given a figure of it, No. 33.

FIG. 33.



Colours—Green, blue, yellow and red.

Mr. Bethune well describes it as a giant among caterpillars. It is about four inches long when full grown. The colour of the body is pale green, and it is covered with tuber-

cles of green, blue, yellow and red colours. It spins a cocoon in a manner similar to *T. Polyphemus*, which it much resembles in its habits save that the cocoon remains attached to the trees. The larva is subject to the attacks of a parasitic *Tachina* fly. Mr. Bethune states that the most effective remedy is to go round the orchard or garden in the winter, and cut off the cocoons which are so large and conspicuous as to be at once seen.

5. THE MAPLE OWLET MOTH. (*Apatela Americana*, Harr.)

Order, LEPIDOPTERA ; Family, NOCTUIDÆ.

During the later portion of the summer months and early in the fall, the caterpillar of the owlet moth may often be met with. It is about three inches long at maturity, the upper side of the body is greenish-yellow, and covered with long soft yellow hairs, with four long slender erect tufts of black hairs, two on the fourth and two on the sixth segments, and a long single tuft on the eleventh segment ; the head, last segment, and all the under side, including the feet, are black. During repose it remains curled up sideways. Dr. Harris writes that "when about to make its cocoon, it creeps into chinks of the bark or into cracks of fences and spins a loose half-oval web of silk, intermixed with the hairs of its body ; under this it then makes another and tougher pod of silk, thickened with fragments of bark and wood, and there when its work is done changes into a chrysalis, in which state it remains till the following summer." The perfect moth expands about three inches. The fore wings are light gray—near the outer margin there is a wavy scalloped whitish line, edged with black, and there are various black lines and streaks edged in the same way ; as are also the reniform or kidney shaped spots in the middle of the wing. The outer edge of both fore and hinder wings is fringed with wavy black and white spots. The hind wings are of a rather darker shade of gray in the males, while those of the female are more dingy or reddish brown. All the wings are whitish and shining on the under side, with a black wavy, curved band and a central semi-circular spot on each, the fringes are the same colour as on the upper side. The body is reddish brown above, and much lighter in colour on the under side. The four wings have the peculiar mark resembling the Greek letter " ψ ," though not so distinctly as in "*Acronycta Psi*," whose history we related in the report for 1870, when treating of the plum. The Thorax is very thick, with prominent collar and shoulders.

The family name of this moth is given to it from its nocturnal habits, having been named by the great entomologist Linnæus from "*Noctua*," the Latin word for an owl. The maple owlet is the largest of our American species. It is very similar to, and has sometimes been mistaken for *Apatela Aceris*, the maple moth of Europe, although the larvae do not bear any resemblance to each other.

6. THE BANDED MAPLE MOTH (*Ophiusa bistrariis*, Hubner.)

Order, LEPIDOPTERA ; Family, NOCTUIDÆ.

It is somewhat hard to believe that this elegant little moth can be the cause of any mischief to our maples, but we must not be deceived by appearances, for it is a veritable enemy.

The moth expands about one inch and three-quarters. The wings are large, and clearly and neatly shapen. The colour of the forewings is a rich chocolate brown, with a broad lighter margin on the outer edge, with a wavy scalloped line dividing it lengthways ; there are two whitish lines edged on the inner side with a deeper shade of chocolate brown, the outer of these two lines forms the inner side of the marginal broad border ; the hind wings are of a uniform reddish brown, with two indistinct transverse lines and bordered with a whitish fringe, margined interiorly with a scalloped black line. The under side of all the wings is of a light brown colour, with a black wavy transverse line and a central black spot in each wing, and a broad whitish border with blackish scalloped margin, and a fringe ; the body is the same colour above as the fore wings ; the head is thickly clothed with deeper red collar ; the feelers are erect and prominent.

The larva has been bred by Mr. William Saunders from the Silver Maple, *Acer*

dasy carpum, and we give the following condensed description from his notes published in the *Canadian Entomologist*, vol. ii. p. 130.

A number of specimens were taken late in July. Their length was 1.40 inches; somewhat onisciform. The head was medium sized, flattened and bilobed; of a pale, ashen gray colour, a dark brown stripe on each side, and a few short grey hairs scattered on its surface.

The body above is brownish grey, with numerous streaks and dots of pale brown; a double irregular dorsal line widening here and there throughout its entire length. There are many other broken lines of the same character, composed chiefly of dots, but none of them continuous. On the hinder part of the twelfth segment is a raised crescent shaped line, edged behind with black, and on the terminal one two whitish dots, with a small patch of black at their base. The spiracles, or breathing pores, are pale, oval, and edged with black. The under surface is paler and bluish-green, with two round central blackish spots on the hinder part of the seventh and eighth segments. The feet are greenish, and semi-transparent. This larva is subject to considerable variation in its colour and markings. When about to go into chrysalis the larva cuts through a portion of a leaf of the tree on which it has fed, and turning it over constructs a snug little case, fastening it up closely and carefully with silken threads, and in this completes its transformations. After remaining in the pupa state about two weeks Mr. Saunders' specimens produced the perfect imago.

Although not appearing in any very great numbers the moth is tolerably common in the western part of the Province.

7. THE MAPLE LEAF CUTTER (*Ornix acerifoliella*, Fitch.)

Order, LEPIDOPTERA; Family, TINEIDÆ.

Many persons, we have no doubt, have often noticed a peculiar appearance of the maple leaves, resembling the effects of fire or frost, and giving a dingy brown look to the whole foliage. It is more or less common every year in this Province, but it has been unusually noticeable in the London district during the past season. It is caused by the larvæ of a pretty little moth, whose dark brilliant blue colour and bright orange yellow head may frequently attract the attention of an observer during the early part of the summer, as the moth flies about from tree to tree, or rests exposed upon the leaves.

This little creature belongs to a family that embraces the smallest in size of all our *Lepidoptera*, and many members of which are very familiar to us, as we know to our annoyance and discomfort when our furs and carpets and wearing apparel are attacked. Dr. Asa Fitch, the talented Entomologist of the State of Massachusetts, was the first to work out the life-history of this destructive little maple leaf cutter, and from his excellent treatise, published in 1856, we intend to make a few extracts. "The cause of this fading of the leaves was recently discovered upon examination. It was found that the green parenchyma or pulpy substance of the leaf was destroyed in spots and irregular patches, leaving only the fine net-work of veins and the transparent cuticle. These spots were commonly in rings or in segments of a circle, with the centres green and unaffected. In addition to these, holes of a nearly circular form appeared in the leaves, about a quarter of an inch in diameter, with others of a smaller size. A dozen or more of these holes were at that time found in almost every leaf; and some of the pieces which had been cut out of the leaf, forming these holes, might be observed adhering like round scales to the surface of the leaf, some on its upper, others on its under side. On elevating this scale from the surface of the leaf another smaller one was found beneath it, and beneath them was a small white worm, which was evidently the artisan by whom all this work had been done—cutting out these circular pieces from the leaf to form a cloak for himself, and when hungry feeding upon the pulpy substance of the leaf, thus forming the circular and irregular spots seen upon it. Occasionally one of these scales might be observed to move slightly along, the worm at such times protruding its head from under the edge of the scale, and with its feet pulling its unwieldy domicile to another part of the leaf."

"The worm within these cases is nearly a quarter of an inch in length when mature. It is slender, and of a flattened cylindrical form, soft and contractible, composed of

thirteen segments marked by slight intervening constrictions. It is dull white, the head, which is strongly depressed, and the three thoracic segments pale rusty brown. An interrupted broad blackish stripe along the middle of the back is more or less distinct. Only the three pairs of legs upon the thoracic segments are distinctly developed."

"These worms, or many of them at least, are carried to the ground upon the leaves, when they fall from the trees in autumn. They remain in their cases and change to pupæ among the fallen leaves beneath the trees, in which situation they may be found early in the following spring."

Dr. Fitch mentions the fact that trees standing alone in fields or yards around houses were exempt from the attacks of the leaf-cutter. Our experience does not confirm this statement, for we found that several isolated trees were badly disfigured around the country house where we spent the past summer months. A small *Ichneumon*-fly, about one-tenth of an inch in length, and pale yellow, is parasitic upon the larvæ cases, and probably is of material service in checking the increase of the moth. Dr. Fitch suggests as a remedy that sheep or cattle be allowed to range the ground occupied by the sugar orchard, and if notwithstanding the trampling of the earth by cattle standing under or travelling around them, the leaves of particular trees show that they are preyed on by this moth, it will be well after the leaves have fallen in autumn to feed salt to the animals under such trees, that any insects among the leaves may be trampled upon and destroyed.

The holes made by these insects are nearly circular when first cut, but by the subsequent growth of the leaf they become oblong.

8. THE MAPLE MEASURING WORM (*Stegania pustularia*, Guenee).

Order, LEPIDOPTERA ; Family, GEOMETRIDÆ.

We quote the following account from Mr. W. Saunders' notes, as published in the *Canadian Entomologist*, vol. iii. p. 325 :

"The larvæ of this delicate looking little geometric moth feeds on the maple. It is common in the London neighbourhood, and may be readily got in season by striking the branches of the trees a sharp blow, when it drops at once part way to the ground, remaining suspended by a silken thread, by means of which, when danger passes, it can regain its position on the tree. It is found full grown about the middle of June, enters the chrysalis state within a few days afterwards, and produces the moth early in July.

"When full grown the larva measures about five-eighths of an inch in length ; body cylindrical, head medium-sized, rather flat in front and slightly bilobed, and of a pale green colour, with a few very fine hairs, invisible without a magnifying glass, scattered over its surface ; mandibles tipped with black."

"Body above bluish green, with thickly set longitudinal stripes of whitish and yellow ; a double whitish dorsal line with bordering lines of yellowish white, neither of which are unbroken, but are formed of a succession of short lines and dots. Below these, on each side, are two or three imperfect white lines, made up of short streaks, and much fainter than those bordering the dorsal line ; spaces between the segments yellowish. The skin all over the body is much wrinkled and folded."

"The under surface is green, with a tinge of yellowish between the segments ; feet yellowish green, prolegs green, faintly tipped with brown."

"The moth is of a pure white colour, with three or four reddish brown spots on the costal margin of each of the fore wings, and with a faint curved line of the same, crossing them a little beyond the middle ; it expands one inch."

The larva feeds on the young and tender leaflets and buds, and of course causes some injury. In all probability the same remedy would be of service as that suggested by Dr. Fitch in the case of the maple leaf cutter.

INSECTS AFFECTING THE PEACH.

By E. B. REED, LONDON, ONT.

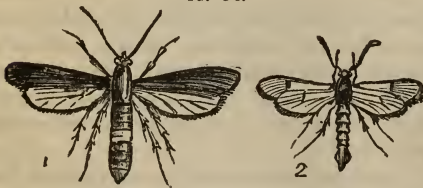
THE PEACH BORER (*Ægeria exitiosa*, Say.)

Order, LEPIDOPTERA ; FAMILY, *ÆGERIDÆ*.

This notorious pest, which has been well termed "the silent and insidious destroyer of the peach tree," is so common, and its attacks are so universal wherever peach-culture is attempted, that we deem it matter of interest to our readers to lay before them the full details of its history. The laborious researches of those able American Entomologists, Mr. Thomas Say, of Philadelphia, Dr. Thaddeus Harris, of Massachusetts, and Dr. Asa Fitch, of New York, have caused the whole history of the peach borer to be well worked up, and it is from their writings that we propose to condense the following treatise for the benefit of our Canadian readers.

Mr. Say first described the insect in 1826, and gave it the name of *exitiosa*, a word signifying "destructive," in allusion to its powers of mischief. The perfect insect belongs to a group or family of moths, which, from their transparent wings and slender bodies with coloured bands, bear so strong a resemblance to certain bees, wasps, hornets and flies that various species have received the names of *apiformis*, the bee-shaped; *vespiformis*, the wasp-shaped; *crabroniformis*, the hornet-shaped; *tipuliformis*, the gnat-shaped, etc. So deceptive is this likeness that even the celebrated naturalist, DeGeer, in writing of one of the species observes, "the first time that I saw it I hesitated to take it with my naked hand, believing that I had found a wasp." The moths fly only in the day time, and they may be frequently seen basking in the sunshine. Their larvæ derive all their nourishment from the wood and pith of the various shrubs and trees which they affect, and in the stems or roots of which they lie concealed.

FIG. 34.



Colours Steel Blue and Yellow Band.

At figure 34 we give a representation of of the perfect or winged state of the peach borer, No. 1 showing the female and No. 2 the male, by which our readers will notice that the sexes differ so remarkably in appearance that it is difficult to believe that they both belong to the same species. The male, No. 2, is of a deep steel blue colour, with various pale yellow marks, and has a glossy satin-like lustre. The antennæ are black, and fringed on the inner side with numerous fine short hairs. The palpi, or feelers, the shoulder-covers, the rings of the abdomen, and of the peculiar brush or fan on the tail are edged with pale yellow. The wings expand about one inch; they are all transparent and glass-like, with a slight tinge of smoky yellow, their veins, margin and fringe are steel blue. The body is slender and cylindrical. The feet are black, with two rings of pale yellow on the shins.

The female, No. 1, has a very dark steel blue body, with a tinge of purple, and a broad band of a bright glossy orange-yellow colour, occupying the whole of the fourth and fifth segments. The abdomen is of a long oval form, nearly twice as broad as that of the male. The antennæ have no fringe along their inner sides. The fore wings are opaque, and of a steel blue colour, with the tips and fringes of a purplish tint. The hind wings are transparent like those of the male; they are broadly margined upon both

sides, and marked at the base with steel blue; they have five thick veins, and commonly there are traces of a straw-yellow stripe on the outer margin towards the tip. The wings expand about one inch and a half. Both sexes have several varieties, but the two above mentioned descriptions are those of the ordinary types.

The eggs are deposited by the moths in the course of the summer, upon the trunk of the tree near the root. Mr. Evan Thomas, as quoted by Mr. Say, says that "they leave from one to fifty, and in some instances nearly three hundred eggs in each tree, according to its size and capacity to support the future progeny. These soon appear, but it is difficult to detect them until they have acquired a growth of two or three weeks, when they are four or five lines in length. From this period their growth is accelerated or retarded in proportion to the quantity of nourishment afforded."

Dr. Fitch writes "that the worms when hatched work downwards, at first in the bark of the root, forming, a slender flexuous channel, which becomes filled with gum. At the distance of an inch or two below the surface the whole of the bark of the root becomes consumed in badly infested trees, and the soft sap wood is also extensively gnawed and eroded, so that frequently the root is nearly severed. The larger worms in the winter season repose with their heads upwards, in contact with the exterior surface of the root, commonly in smooth longitudinal grooves which they have excavated, their backs being covered over with the castings mingled with the gum and with cobweb-like threads, thus forming a kind of cell, the cavity of which is considerably larger than the body of the worm inhabiting it. The smaller worms have no such cell, but lie promiscuously in the gum, or between it and the root."

The presence of these borers may always be readily detected by the castings and gum which issue from the hole in the bark.

Dr. Harris tells us "that these borers, when nearly one year old, make their cocoons either under the bark of the trunk or root, or in the earth and gum contiguous to the base of the trees. Soon afterwards they are transformed to chrysalides, and finally come forth in the winged state, and lay the eggs for another generation of borers."

"The last transformation takes place from June to October, most frequently, however during the month of July in the State of Massachusetts. Here, although there are several broods produced by a succession of hatches, there is but one rotation of metamorphoses consummated within a year. Hence, borers of all sizes will be found in the trees throughout the year, although it seems necessary that all of them, whether more or less advanced, should pass through one winter before they appear in the winged state."

Dr. Fitch also confirms the statement that whoever examines infested roots will find worms upon them of all sizes, at all times of the year. From his report it appears that the

FIG. 35.



pupa state lasts at least three weeks in the warmest part of the summer, and that in the State of New York the moths generally deposit their eggs about the end of July and the beginning of August. At fig. 35 we give a faithful representation of the full grown larva, and we quote its description as given by Mr. Saunders in the *Canadian Entomologist*, vol. iii.

The larva is a naked, soft cylindrical grub, slightly flattened on its under side, and measures when full grown over half an inch in length, and nearly a quarter of an inch in diameter. It is divided into fourteen nearly equal segments by broad transverse constrictions.

The head is of a medium size, with a depressed line down the centre, dividing it into two lobes. It has a triangular piece inserted in the middle, with its base towards the mouth and its apex terminating just under the anterior edge of the second segment. The head is also flattened, and of a reddish colour, becoming darker, almost black, on its anterior edge. The jaws are black and prominent. The body above is of a dull pale yellow, with the segments or rings of the body deeply cut. The second segment is of a pale reddish brown colour, smooth and horny looking. On each segment there are a few minute pale reddish dots, from which arise short reddish or brownish hairs—those along the sides and on the posterior extremity being somewhat larger. A faint line runs along each side through the stigmata or breathing pores of a paler shade on the rest of the body. The stigmata are small, nearly round, and of a dull reddish colour. The under surface is very similar in colour to the upper. The feet are tipped

with reddish brown, and the prolegs are pale yellow, with the fringe of hooks crowning each, of a dark reddish brown.

From Dr. Fitch we learn that "when ready to enter the pupa state the worm crawls upwards to the surface of the ground, and there forms for itself a follicle or pod-like case of a leathery texture, made from its castings, held together by dry gum and cobweb-like threads. This follicle is of a brown colour, and oval in its form, with its ends rounded; it is about three-fourths of an inch long, and over one fourth in diameter, but is variable in its size, being sometimes but half an inch long. Its inner surface is perfectly smooth, and of the colour of tanned leather. It is placed against the side of the root, often sunk in a groove, which the worm appears to have gnawed for this purpose, with its upper end slightly protruding above the surface of the ground. But if the earth has been stirred recently, so as to lie loose around the root, the worm will commonly form its follicle an inch or more below the surface."

A great variety of remedies have been proposed by the numerous writers who have treated upon this insect, but we think that the following extracts will give the results of those experiments that appear to have met with the best success.

Dr. Harris informs us "that the following plan, which was recommended by me in the year 1826, and has been tried with complete success by several persons in this vicinity, will effectually protect the neck or most vital part of the tree from injury. Remove the earth from the base of the tree, crush and destroy the cocoons and borers which may be found in it and under the bark, cover the wounded parts with the common clay composition, and surround the trunk with a strip of sheathing-paper eight or nine inches wide, which should extend two inches below the level of the soil, and be secured with strings of matting above. Fresh mortar should then be placed around the root, so as to confine the paper and prevent access beneath it, and the remaining cavity may be filled with new or unexhausted loam. This operation should be performed in the spring, or in the month of June. In the winter the string may be removed, and in the following spring the trees should again be examined for any borers that may have escaped search before, and the protecting application should be renewed."

Mr. James Worth, who is largely quoted by Mr. Thomas Say, writes: "The best plan of guarding against the ravages of this insect which I have found, is to examine the tree early in the month of July; take a bricklayer's trowel, and opening the ground around the trunk the lodgment of the insect will at once be discovered by the appearance of gum, and it can be readily destroyed. One person can thus examine more than a hundred trees in less than half a day, and very few, if any, of the insects will escape."

Mr. C. V. Riley, the State Entomologist of Missouri, in his first annual report published in 1869, gives yet another remedy, and one which appears to be so successful that we cannot refrain from giving our readers the full extract. "I have had ample occasion," he writes, "to witness the effect of the mounding system during the summer in several different orchards, and am fully convinced that it is the best practical method of preventing the attacks of this insect, and that it matters little whether ashes or simple earth be used for the mound. True, there are parties who claim that the almost total exemption from borers in mounded peach-orchards is due, not to any special effect produced by the mound, but to the general rarity of the insect. But I have found no general rarity of the insect wherever I have been in our own State, but, on the contrary, have with difficulty found a single tree in any orchard that was in anywise neglected that did not contain borers; while I have found mounded trees entirely exempt. The following paragraph communicated to the *Western Rural* by Mr. B. Pullen, of Centralia, Illinois, touches on this point, and I can bear witness to the thrift and vigour of Mr. P.'s trees:

"As spring will soon be upon us, I wish to add my testimony in favour of the "banking system," as a preventive against the attacks of the peach borer. As to its efficiency there can be no doubt, I have practised it for four years with complete success. I would not advise its adoption until after the trees are four years old. During most of this period the bark is tender and trees are liable to be entirely girdled by even a single worm. Safety lies only in personal examination and removal with the knife in fall and spring (September and April). In April of the fourth year bank up to the height of from ten to twelve inches, pressing the dirt firmly around the tree. A little dirt should be added each successive spring; it is not only a preventive, but a great saving of labour."

As further testimony, and with a view of giving the method by which the trees may be mounded, I also insert the following communication from E. A. Thompson, of Hillside (near Cincinnati), Ohio, which appeared in the *Journal of Agriculture* of November 14th, 1868:

"The mounding system was first practised, so far as I know, by Isaac Bolmar, of Warren County, Ohio. I visited his orchards some years ago, acquainted myself with his system, and concluded to try it upon my orchard of 4,000 trees—then one year planted. I plant my trees in the fall, and in the spring following cut them back to six inches above the bud. The tree, then, instead of having one body has several—from three to six. The second summer I plough both ways, turning the furrows towards the trees. The men follow with shovels, throwing the loose soil around the trees to the height of about one foot. In the fall I cut the trees back, taking off about one-third of the year's growth. The next spring or summer I pursue the same method, raising the mound about one foot higher, cut back in the fall, and in the third summer repeat the process, raising the mound another foot, which finishes the job. The mound will then be about three feet high at its apex, and six feet in diameter at its base. The mounding need not be done in the summer or at any particular season; it is just as well done in the fall when the hurry is over. The dirt is never taken away from the trees; in fact it cannot be removed without injury to the tree, for the young rootlets each year keep climbing up through this mound. I had occasion to remove one of these mounds a few days since, and found it a mass of healthy roots."

"Now for the benefits. First, you have no trouble with the grub or borer; he must have light and air, and the mound is too much for him; he comes out, and that is the last of him. I have never wormed my trees or hunted for borers, and an orchard of healthier or thriftier trees cannot be found. It has been asserted that the borer will reappear again near the top of the mound—but I am satisfied this is not the case; I have never thus far been able to find one. Second, the system imparts longevity to the tree. I saw a tree in Warren County, treated in this manner, *thirty* years old, still healthy and bearing annual crops. Third, trees thus treated are not subject to disease. I have never had a case of *yellow*s in my orchard. Fourth, the expense is trifling—one man can mound fifty trees per day. The system can be applied to old as well as young orchards; but if old trees are thus treated they should first be severely cut back, when they will make a growth of young wood."

It is also stated that tobacco stems thrown round the stem of the trees have been productive of good, as they seem to have the effect of keeping away the moth.

INSECTS INJURIOUS TO THE POTATO.

BY E. B. REED, LONDON, ONTARIO.

Addenda to the Report of 1870.

Fig. 36.



Colours—(a) deep orange; (b) and (c) venetian red, inclining to cream colour; (d) and (e) cream colour and black.

During the past year we looked forward with considerable anxiety to the effect that the Colorado Beetle would produce on the potato crop; we are glad to report that on the whole, less mischief has been done than we anticipated. It is somewhat difficult, however, to arrive at an accurate estimate. The Bureau of Agriculture forwards every year to the Secretaries of the Electoral Division Agricultural Societies a printed circular requesting a detailed return of the crops in each district, if these returns were properly made they would afford much valuable information. It is to be regretted that they are not more universally attended to. So far as we can learn only 40 of these returns have been made for 1872, and it is on these partial details that we must base our analysis for the Potato crop. While, however, the ravages of the beetle have been somewhat less than we expected, its increase in numbers and onward progress have yet been such as to cause not only a material effect on the crop, but also to maintain a good deal of alarm amongst the farming community. A comparison of the crop returns for the two past years fully confirms the statement made in our former reports, that the second and third years of appearance of the beetle are worse than the first.

A few statistics may not be out of place here.

In 1871, 45 Agricultural Societies sent in returns shewing an average crop of 131 bushels per acre.

In the past year, 1872, only 40 Societies reported, with an average of 118 bushels per acre.

In 1871 only 14 Societies reported the presence of the beetle, while 23 were free from it, and none badly affected.

In 1872, 26 Societies report injury from the beetle, and 8 report very serious damage, in some cases almost total destruction, and only 14 appear to be free.

It is to be noticed that all the western places which in 1871 were the most badly affected, were in 1872 far more seriously attacked. In no one place do we find that the beetle after making its appearance one year, has not reappeared in the following season. The following list of Societies reporting the advent of the beetle for the first time, will shew what its onward progress is:—

Middlesex, N.	Hastings, E.	Perth, S.	Norfolk, N.
Durham, W.	Northumberland, W.	Simcoe, S.	Wellington, S.
Wellington, N.	Middlesex, W.	Niagara,	Grey, S.
Frontenac,	Peterborough,	Victoria,	Oxford, N.
Hastings, N.			

While the following were those receiving most injury:—

Bothwell,	Essex,	Middlesex, E.	Wellington, N.
Lambton,	Perth, S.	Elgin, E.	

We are quite aware of the inaccuracy of these statistics, as we know that in some of the new places the beetle appeared in 1871. We base the statements, however, upon the returns given to the Commissioner. It would be very desirable to obtain statistics of the various sorts of potatoes grown, as we are quite satisfied from our own experience that some varieties are much more subject to attack than others, and we would beg respectfully to suggest to the Commissioner of Agriculture the propriety of obtaining such information during the coming season.

From the monthly reports of the Agricultural Department published at Washington, we obtain some information respecting the ravages of the Colorado Potato Beetle in the United States.

The returns of their correspondents shew that the crop of 1872 was less than that of 1871 by about six millions of bushels. This, however, comprehends "sweet potatoes" as well. The western States, in which the potato crop had suffered for several years past from the ravages of the Colorado beetle, reported diminishing losses from that cause, and were the only States North Carolina and Texas excepted, reporting increased production.

In the following twelve Western States, viz., Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Nebraska, Missouri, Kansas, California, and Oregon, the average yield was only 98 bushels to the acre, while the average price on December 1, 1872, was 50 cents per bushel.

Harding County, Iowa, is reported exempt, after several years' visitation of the beetle "Tyck's Seedling" Potato is claimed to be "bug proof."

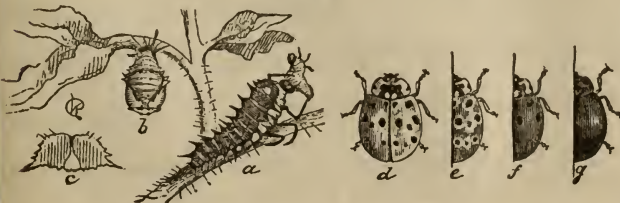
We give these statistics as it is from the Western States that the Colorado Beetle has worked its way, and they shew to some extent what effect has been produced by its ravages for some years past.

In our immediate neighbourhood at London the beetles literally swarmed, and thousands were daily trodden down on the sidewalks and streets, and we look for a still further increase next year. We may mention as a curious fact, that although we had previously seen many hundreds of thousands of the perfect beetle, it was only last season that we for the first time saw even one in actual flight; but perhaps the numbers we saw this year on the wing fully compensated for the "masterly inactivity" of those formerly observed by us.

Our natural allies the insect enemies of the Colorado Beetle appear to be slightly on the increase, thus furnishing further evidence, if any is required, that Dame Nature still maintains the "balance of power," and that for every natural evil that arises, some natural remedy is sure to be found; and although the remedy perhaps may not, in our estimation, work quite so rapidly as we could desire, yet it is none the less sure and effectual in the end.

Especially have we noticed the more frequent presence of the Fifteen Spotted Ladybird

FIG. 37.



(*Mysia 15 punctata*, Oliv.—see Fig. 37—and several friends have brought us in specimens of *Perillus circumcinctus*, Say—see Fig. 38—which they detected in the act of attacking the larvæ of the Colorado beetle.

We still continue to recommend Paris Green as the chief

remedy. Wherever it has been properly used, good results have invariably been obtained. It is, of course, of the utmost importance that the quality should be good. As a marketable commodity, the quality of Paris Green is exceedingly variable. It is an arsenite of copper, and the best qualities contain about 60 per cent. of arsenic, on which its activity depends, but the inferior grades contain a much smaller percentage, and are consequently much less effective, and in some cases almost worthless for this purpose. We are satisfied that every reported case of failure in the use of Paris Green as a remedy for the Colorado potato beetle, may be traced directly to the inferior quality of the poison used. We have been informed by Mr. W. Saunders, of London, Ont., that he has found Plaster of Paris a most excellent substitute for flour to mix the poison with. It should, most certainly, be very useful as a fertilizer, and where available, would doubtless be found to obtain success. Its cheapness also is a very important point in its favour. Its proportions for mixture are somewhat more, owing to the difference between the weight of the plaster and that of flour, for while the latter works well in the ratio of from 15 to 20 parts to 1 of Paris Green, the Plaster will require at least 30 to 40. Flour, however, we consider for several reasons to be still a capital material for this purpose.

FIG. 38.



There is a mixture prepared at Strathroy, Ont., which it is claimed is a very good remedy for the beetle. We tried some on a small scale, but not enough to justify us in recommending it as a substitute for the Paris Green. We purpose testing it more extensively this next season.

In the State of Illinois we are told that the following plan has been tried and found to succeed, *i.e.*, to plough a small furrow between the rows of potatoes, knock off with a stick all the larvæ into the furrows, and then by running the plough up the row again cover them with earth.

We can hardly imagine that in our climate this would answer at all, for as the larvæ when full grown seek the earth in which to undergo their transformation into the pupal and perfect states, it would seem that this plan would only kill a few of the tenderest and youngest of the brood, and would not interfere with the older and more mature ones.

From the general returns, the early crops appear to escape the more easily, and in several instances the late crops seem to have been saved by a plentiful supply of rain, even after the bugs had attacked and finally left them.

The chief thing, however, seems to be not to grow too large a crop, and to exercise a vigilant watch over what is grown; this, with hand picking and the use of Paris Green will, we think, ensure success in most instances.

We have not heard of a single case of poisoning from the bite or handling of the beetle. As to our opinion on this point, we refer our readers to our Report for 1871.

We would beg here to record our thanks to our esteemed friend, Professor Geo. Buckland, the able and well-known Secretary of the Ontario Bureau of Agriculture, for his courtesy in furnishing us with statistics of the past year's crop; the Entomologists of Ontario indeed owe a great deal to the Professor for his invariable kindness and attention to their wants, and the promptitude with which he always seeks to assist them in carrying out their attempts at Practical Entomology. We feel sure that we express the feeling of all the members of the Entomological Society of Ontario, in offering to our friend all the kindly wishes of this Christmas season, and trusting that he may long be spared to superintend the working of the Bureau with which he has been so long and so honourably associated.

ON SOME INNOXIOUS INSECTS

BY W. SAUNDERS, LONDON, ONTARIO.

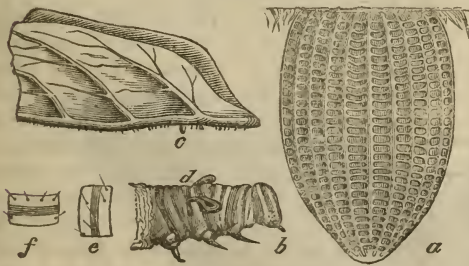
Under the above heading it is proposed to give our readers the life history of several of our more common insects, which are neither injurious nor beneficial to the farmer or fruit grower, but which from their great abundance, or else from some peculiarity in their appearance, habits or size, excite curiosity and claim our attention.

THE ARCHIPPUS BUTTERFLY (*Danais Archippus*, Fabr.)

The first insect of which we propose to treat is one of our commonest butterflies, known as the Archippus Butterfly (*Danais Archippus*.) Its first appearance on the wing is usually about the middle of May, but it is not very common until later in the season. It is said that it passes the winter in a state of torpidity, hidden in some sheltered spot where it sleeps securely till awakened by the warmth of spring. The few individuals which thus early appear, lay their eggs on the tender leaves of the young milkweed plants (*Asclepias cornuti*) and other species of *Asclepias*, and also on the bitter root (*apocynum Androsæmefolium*); this takes place during the latter part of May or the beginning of June.

The eggs when first laid are white, but in two or three days they become yellow, and then dull grey just before the time of hatching. They are $\frac{1}{16}$ th of an inch long, conical in form, flattened at the base. When viewed with a magnifying glass they appear very beautiful, (see figure 39) where *a* represents the egg much enlarged, while at *c* it is shown of the natural size, and in its usual position on the under side of the leaf. On each egg there are about twenty-five raised longitudinale lines or ribs, and about the same number of pross-lines between each, so that the whole appears covered with a regular and beautiful network as shown in the figure, which has been drawn from nature, as those also have which are to

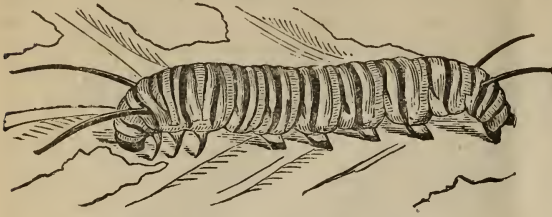
FIG. 39.



follow by our esteemed friend, Prof. C. V. Riley, of St. Louis, Mo. In about six or seven days the egg matures, producing a very small caterpillar, one-tenth of an inch long, with a large black head and yellowish white body, with a few black hairs on each segment or ring, as shown at *e* and *f* (Fig. 39.) This caterpillar grows very rapidly, and soon finds that its skin, although very elastic, will bear no further stretching, when it conveniently disrobes itself and appears in colours fresh and gay, by simply crawling out of its skin through a rent down the back, which takes place just at the proper time. This process, which is called moulting, is repeated three times during the growth of the larva, and requires no other preparation for its accomplishment than that of a short fast. Any abstemiousness shown at these critical periods in the creature's history is however soon compensated for by the enormous appetite with which it is furnished as soon as the crisis is past. At *b* (Fig. 39) the head and anterior segments of the larva just before its last moult, is figured for the purpose

of showing how the long fleshy horns with which the mature caterpillar is furnished are conveniently coiled up while lying buried beneath the old skin.

FIG. 40.



Colours—White, Black and Yellow.

low occupies the spaces between. On the third segment (reckoning the head as first) are two long black fleshy horns, and on the twelfth two others of a similar character, but shorter, and not quite so stout.

The underside is black, with a greenish flesh-colour between most of the segments.

The next change which comes over this caterpillar is that which transforms it to a pupa or chrysalis, a most astonishing transformation, when the voracious larva becomes for a time torpid, senseless, and almost motionless, while preparing for that change when it is to appear in brilliant plumage and gracefully float and flutter through the air, enjoying the summer's sunshine and sipping the nectar of flowers. Kirby in his "Introduction to Entomology" says, "were a naturalist to announce to the world the discovery of an animal which for the first five years of its life existed in the form of a serpent, which then penetrating into the earth and weaving a shroud of pure silk of the finest texture, contracted itself within this covering into a body without external mouth or limbs, and resembling more than anything else an Egyptian mummy; and which, lastly, after remaining in this state without food and without motion for three years longer, should at the end of that period burst its silken cerements, struggle through its earthly covering, and start into day a winged bird—what think you would be the sensation excited by this strange piece of intelligence? After the first doubts of its truth were dispelled, what astonishment would succeed! Amongst the learned what surmises! what investigations! Amongst the vulgar what eager curiosity and amazement! All would be interested in the history of such an unheard-of phenomenon." Yet the changes which the insect we are referring to undergoes in common with many others, is scarcely less wonderful or startling.

FIG 41.



In Fig. 41 the larva is represented as it appears at different periods during its transition to the state of chrysalis. At *a* it hangs suspended from a silken web in which its hind legs are entangled, and which has been previously attached by the caterpillar to the underside of a leaf, or fence rail, or some other secure place of retreat; and here, while hanging for about a day, the larva contracts its length and increases its bulk, especially on the anterior segments. By and by a

rent takes place in the skin down the back, and the chrysalis begins to appear, and after long and persevering efforts in stretching, contracting, and wriggling the body, the skin is crowded backwards and worked nearly up to the hinder extremity, as shown at *b*; and now a difficulty presents itself, and a feat has to be performed to imitate which would puzzle the most daring acrobat, for without hands or feet to hold on by, it has to withdraw itself from the remnants of its larva skin, and hang itself up by a black protuberance crowned with a bunch of hooks at the extremity of the chrysalis. Although this feat is so wonderfully difficult, it is very seldom indeed that a failure occurs in its accomplishment. A ready explanation of the means by which this is done is given at *c*, (fig. 41.) The joints of the abdomen being freely moveable, are first stretched against a portion of the larva skin, and by a sudden jerk backwards the skin is grasped and firmly held while the terminal segments are

withdrawn and the process of suspension completed. Soon after this the chrysalis begins a series of wriggling and jerking movements with the view of dislodging the empty larva skinn after the removal of which it remains motionless unless disturbed, and becomes gradually, harder and more contracted until it assumes the appearance represented by Fig. 42.

FIG. 42.



Colours—Green and Gold.

The chrysalis is about an inch long, and of a beautiful pale green colour spotted with gold, and with a band of golden dots extending more than half way round the body above the middle; this band is shaded with black. There is also a patch of black around the base of the black protuberance by which it is suspended, and several dots of the same on other portions of the surface. The chrysalis state seldom lasts more than ten or twelve days, and towards the expiration of this period the handsome green and gold colours begin to fade, and the chrysalis grows gradually darker until the diminutive wings of the future butterfly show plainly through the semi-transparent enclosure. The escape of the imprisoned insect, now nearly ready for flight, is usually made quite early in the morning. We have several times watched for their deliverance, and have usually found it to take place soon after daybreak. A sudden crackling and slight tearing sound is heard, which arises from a splitting of the chrysalis case part way

down the back; the fore legs, head and antennæ are first withdrawn, and in a very short time the entire insect is liberated. Strange looking creatures they are when they first present themselves to view, with bodies so large as to be out of all proportion to the tiny wings. When fully developed their wings measure about four inches across, but when fresh from the chrysalis they are about the size of those of a large bee. The first necessity now for the welfare of the individual is to find a suitable location where the wings may be held in a good position for expanding, for without such favourable circumstance they would never attain a serviceable size. It is necessary that a position should be secured where the wings can hang down as they are expanding, for which reason the underside of a twig is often selected; and here, securely suspended by the sharp claws with which the feet are furnished, the wings undergo in a short time the most marvellous growth it is possible to imagine. We have seen the wings double their size by actual measurement within three minutes, and the whole process, from the time of the escape of the butterfly to that of the full development of the wings, seldom occupies more than from fifteen to twenty minutes, and ere the sun is high in the heavens, on the morning of its birth, the soft flabby wings have dried and become rigid, and the butterfly is ready for flight.

A wing clipped from the insect immediately after its escape, and examined under the microscope, reveals the fact that the thousands and tens of thousands of scales with which the wings are covered, and which afterwards assume such beautiful feather-like forms, are now

FIG. 43.



Colours—Bright Orange, Red, Black and White.

early all linear or thread-like, not folded up or wrinkled, but undeveloped. Impressed with this thought, one is fairly astonished at the almost incredible change wrought in so limited a time, for the growth embraces not only the extension of the membranous surface of the

wing, but the enlargement and maturity of every scale or feather on it, the individuals of which appear but as particles of dust to the naked eye. What a wonderful and intricate system of circulation and power of nutrition must be possessed to accomplish this marvellous result.

The Archippus Butterfly (see Fig. 43) is so well known that it needs but little description to recall its appearance, especially where so good a figure is given. The ground colour, of the wings when fresh is a beautifully bright orange red, the veins are heavy and black, and the margins are spotted with white, the latter being more or less covered or encroached upon by the general colour. Near the middle of the hind wings there appears in the figure, on one of the veins, an enlarged black streak or blotch, which, when closely examined, is found to be a small excrescence: as this is found only on the wings of the male, the sexes may be readily distinguished by this peculiarity.

We have frequently seen these butterflies in great numbers on pine trees which have been infested with aphids, attracted there no doubt by the sweet exudations which flow from the bodies of the aphids, thus interfering with the rights and privileges which have always been accorded to the industrious ant. They also have a fashion of congregating at times usually late in the season, in prodigious swarms, consisting of tens of thousands or hundreds of thousands of individuals. In September, 1871, we met with a swarm of this character, the particulars of which were communicated to the *Canadian Entomologist*, Volume 3, Page 156, as follows:—"On the first day of September while driving along the Lake Shore Road on the borders of Lake Erie, I was favoured with a sight which will not soon be forgotten. For several days previous *archippus* butterflies had been unusually abundant, and early in the morning on the day in question, some groups—numbering probably hundreds of individuals—which had rested during the night on trees adjoining the hotel at Port Stanley, were gyrating in a wild manner at all heights, some so high up that they appeared but as moving specks in the sky; others floating lower, over the tops of the trees in an apparently aimless manner. This was, however, as a mere skirmishing party when compared with the vast hosts seen a little later.

"It was about nine o'clock in the morning, when, passing a group of trees forming a rude semi-circle on the edge of a wood facing the lake, the leaves attracted attention, they seemed possessed of unusual motion and displayed all over fitful patches of brilliant red. On alighting, a nearer approach revealed the presence of vast numbers—I might safely say millions—of these butterflies, and they were clustering everywhere. I counted those on a small space, about the size of my two hands, on one of the trees, and there were thirty-two butterflies suspended on it, and the whole group of trees was hung in a similar manner. When disturbed they flew up in immense numbers, filling the air, and after floating about a short time gradually settled again. There appeared to be nothing on the trees to attract them, yet when undisturbed they seemed to prefer resting in quiet, as if enjoying the presence of congenial society. I regretted not having a net with me, as I should like to have captured a number of them, to have seen in what proportion the sexes were represented in the company. Their food plants—the various species of *Asclepias*—did not appear to be unusually common in that section. I apprehended that many of the individuals must have travelled some distance to be present at this gathering." No satisfactory reason has yet been assigned for such gatherings. The fact that the larvæ of the *archippus* is but seldom affected with parasites may partially account for their occasional abundance; we only know of one small ichneumon infesting them, and have but rarely met with this.

THE DISIPPUS BUTTERFLY. (*Limenitis disippus*, Godt.)

This butterfly is also common, but not nearly so abundant as the species last described. In the perfect, or winged state, it resembles the *archippus* butterfly very closely in colour, but it is smaller in size and may always be distinguished by the black band which crosses the hind wings, which is altogether wanting in the *archippus*.

The *disippus* butterfly is represented by Fig. 44. The ground colour of the wings is of the same warm orange red as the *archippus*; the veins also are heavy and black, and the wings along their margins spotted with white. In the figure the left wings represent

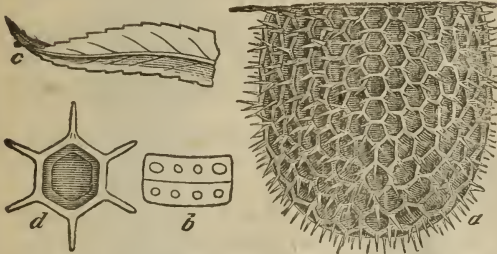
the upper surface, while those of the right, which are slightly detached from the body,



Colours, Orange, Red, Black and White.

ing object: *a* shows it highly magnified, while at *c* it is shown of natural size and in its natural position on the willow leaf. At *d* is represented one of the minute cells of the egg, very highly magnified, showing the little threadlike processes which proceed from each angle. Mr. Riley, who was the first to observe this egg, thus describes it in his "Third Annual Report," page 154. Length 0.38 inch. Diameter at base about the same. Globular, with top often slightly depressed Hexagonally reticulate, the cells more or less regular, sunken so as to give

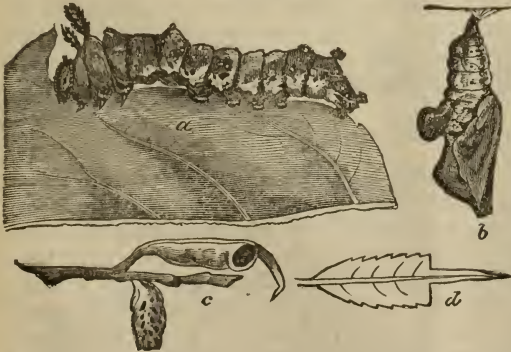
Fig. 45.



the egg a thimble-like pitted appearance, and about ten of them in the longitudinal row, and thirty in the circumference. Covered with translucent filamentous spines, one arising from every reticulate angle and giving the egg a pubescent appearance. Each spine about as long as the cell is wide, those on the top being longest." He also says that the colour of the egg is at first pale yellow, but it soon becomes grey as the young larva within develops. These eggs are usually deposited singly near the tip of the leaf, generally on the underside, but sometimes on the upper side, and occasionally two or even three together.

The newly-hatched larva is nearly one-tenth of an inch long, with a large yellowish brown head. The body is pale yellowish brown with darker streaks, and with a few pale dots and warts, from which latter arise pale spines or bristles. In about a month from the time of hatching the larva becomes full grown, and appears as shown at *a*, Fig. 46, the following description

Fig. 46.



whitish green, raised considerably above the second, with a flat ridge above, having a long brownish horn on each side of it, thickly covered with very short white and brown spines; fourth segment about the same as third, with the same kind of ridge above, with a small tubercle on each side, tipped with a bunch of short whitish spines; between the ridges on third and fourth segments are two small black dots above. Each segment from fifth to thir-

show the under surface. The two surfaces differ but very little in colour and markings. It appears on the wing a little later in the summer than *archippus*, and deposits its eggs on the willow, which is its favourite food plant. Mr. Riley says that it feeds on the poplar and also on the plum. Although the *disippus* butterfly resembles the *archippus* so closely in the winged state, in the earlier periods of its history it is very dissimilar.

The egg is well represented by Fig.

45, and is a very beautiful and interesting object. At *c* it is shown of natural size and in its natural position on the willow leaf. At *d* is represented one of the minute cells of the egg, very highly magnified, showing the little threadlike processes which proceed from each angle. Mr. Riley, who was the first to observe this egg, thus describes it in his "Third Annual Report," page 154. Length 0.38 inch. Diameter at base about the same. Globular, with top often slightly depressed Hexagonally reticulate, the cells more or less regular, sunken so as to give the egg a thimble-like pitted appearance, and about ten of them in the longitudinal row, and thirty in the circumference. Covered with translucent filamentous spines, one arising from every reticulate angle and giving the egg a pubescent appearance. Each spine about as long as the cell is wide, those on the top being longest." He also says that the colour of the egg is at first pale yellow, but it soon becomes grey as the young larva within develops. These eggs are usually deposited singly near the tip of the leaf, generally on the underside, but sometimes on the upper side, and occasionally two or even three together.

The body above is dark rich green, with patches and streaks of dull white; the second segment is smaller than the head, and its surface covered with many whitish tubercles: the third segment dull

teenth inclusive, has two tubercles, one on each side, and in a line with the long horns on third segment, each crowned with a cluster of whitish spines; the tubercles on sixth and twelfth segments are much larger than the others those on the eleventh and terminal segments next in size, those on the ninth smallest. The tubercles on the seventh, eighth, tenth and eleventh segments have a streak of white at their base, and each segment behind fourth, excepting ninth, has several smaller tubercles of a bright blue colour. A large whitish patch covers nearly the whole of the ninth and parts of the eighth and tenth segments, and another of a similar character covers the second, third and part of the fourth. A white stripe extends along each side, close to the under surface, from the fifth segment to the end of the body, and in which is set a small cluster of whitish spines about the middle of each segment, from sixth to tenth inclusive. On each side of seventh, eighth and tenth segments is an elongated blackish spot, just above and behind the spiracles; the terminal segment has two dark greenish brown spots above in front of the tubercles. The spiracles are rather large, oval and brownish-black.

The under side is whitish-green, with a central dull white stripe on the hinder segments; the feet are brown, ringed with brownish-black; the prolegs pale greenish, faintly tipped with brown.

This caterpillar varies somewhat in colour, some specimens being of a paler green than that just described.

The chrysalis, Fig. 46, *b*, Mr. Riley describes as "marked with burnt umber, brown, ash grey, flesh-colour and silvery white, and is characterized, like that of the other species of the genus, by a curious, thin, almost circular projection, which has been likened to a Roman nose, growing out of the middle of its back."

There are two broods of this insect during the year; the larvæ resulting from the eggs deposited by the second brood usually attain to less than half their full growth before winter, when they hibernate and complete their growth the following spring. The interesting preparations made by these caterpillars in the construction of little cases, in which they rest tolerably secure from harm while in this state of torpor, is thus described by Mr. Riley "First and foremost—with wise forethought, and being well aware through its natural instincts that the leaf which it has selected for its house will fall to the ground when the cold weather sets in, unless it takes measures to prevent this—the larva fastens the stem of the leaf with silken cables securely to the twig from which it grows. It then gnaws off the blade of the leaf at its tip end, leaving little else but the mid-rib, as shown in Fig. 46, *d*. Finally, it rolls the remaining part of the blade of the leaf into a cylinder, sewing the edges together with silk. The basal portion of the cylinder is, of course, tapered to a point, as the edges of the leaf are merely drawn together, not overlapped; and invariably the lower side of the leaf forms the outside of the house, so as to have its projecting mid-rib out of the way of the larva, as it reposes snugly in the inside. The whole when finished (see Fig. 46, *c*,) has somewhat the appearance of the leaf of a miniature pitcher plant. These curious little cases may be commonly found upon our willows or poplars in winter time.

This insect is liable to the attacks of several parasites, which effectually prevent its increase beyond certain limits. One of these parasites is a tiny dark four-winged fly, which infests the eggs of the *disippus* butterfly; another is a very small black four-winged fly; and a third a larger two-winged fly, both of which attack the insect in its caterpillar state.

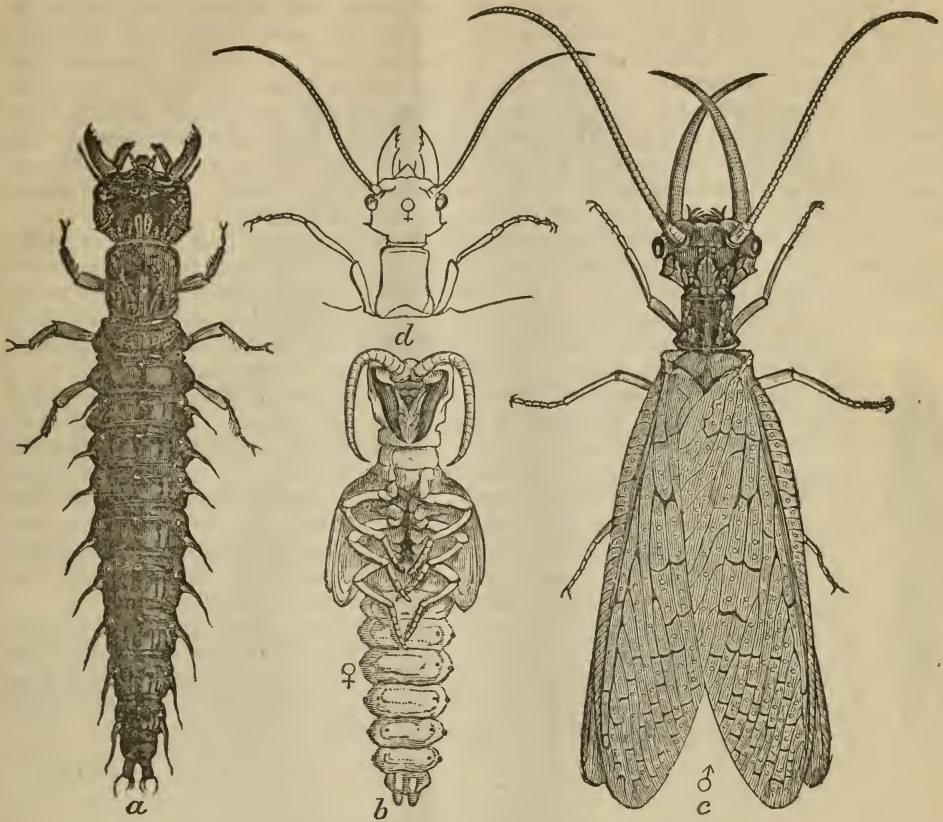
THE HELLGRAMMITE FLY (*Corydalis cornutus*—Linn.).

This is an insect which is not uncommon throughout Ontario, and whenever and wherever found, either in the larval or perfect state excites much surprise and curiosity from its large size and formidable appearance; it is not, however, in any way poisonous, as some people imagine it to be. In Fig. 47 this insect is represented in its several stages, while the expanded female is shown in Fig. 48. The larva—a most diabolical looking creature, *a*, Fig. 47—spends the earlier portion of its life in the water, crawling and swimming about upon the bottoms of rivers and streams, feeding upon the larvæ of various other insects which also inhabit the water. Mr. Riley has published a very interesting account of this insect in the first vol. of the American Entomologist, from which most of the following remarks are condensed.

Most aquatic larvæ spend the period of their chrysalis state in the water, and only emerge therefrom when ready to pass into the perfect or winged state; but the insects form

ing the group to which this larva belongs, leave the water while they are still in the larval state and do not usually become pupæ for several days or even weeks thereafter. Hence the Creator

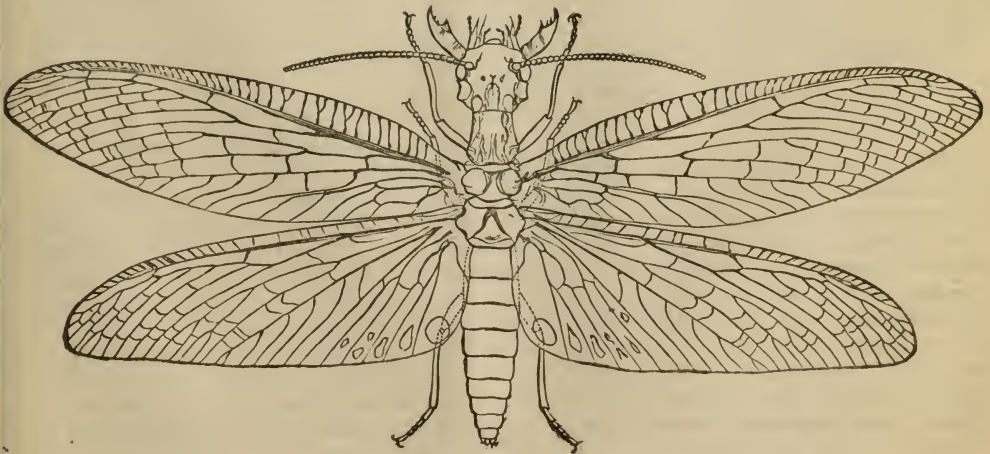
Fig. 47.



Colours—(a) dark brown, (b) whitish, (c) and (d) light brown.

to meet their necessities has given them a double system of respiration—a set of gills to breathe with in the water, and a set of breathing holes, or spiracles, to breathe with upon

Fig. 48.



land. In this larva the gills assume the form of paddle-like appendages, and are placed one pair upon each of the seven front segments of the abdomen, while the spiracles are arranged in the usual manner along the sides of the body. After leaving the water the larva crawls rapidly about, chiefly in the night time, in search of a safe and suitable place in which to spend the chrysalis stage of its existence, usually selecting the under surface of a flat board or log, or burrowing under some large stone. Before attaining its object it sometimes wanders as much as a hundred feet from the water's edge, and an instance is given of one which crawled up the wall to the roof of a one-story building, and then tumbled accidentally down the chimney, to the great dismay of the good woman of the house. At this stage of their existence they are sometimes used by fishermen for bait, and having a very tough skin, one larva often suffices to catch several fish. They can pinch pretty sharply with their strong jaws, and they use the processes at their tail to assist them in climbing.

After a suitable hiding place has been selected, the larva forms a rude cell in the earth, and here changes to an inactive chrysalis (see Fig. 47, *b*). In this figure the wing cases are slightly spread apart from the body to show their shape and structure, whereas in nature they are closely appressed to the sides of the body. The larva leaves the water usually about the beginning of June, and by the end of that month, or the beginning of July, the perfect insect bursts its bonds and appears in the winged state.

Fig. 49.



In this form it measures, when its wings are spread, from four and a half to five inches; these, as shown in the figure, are gauze-like and covered with an intricate network of veins. The forewings are streaked with dark brown and sprinkled with whitish dots, of which latter there are also a few on the hind wings. The male—Fig. 47, *e*—is remarkable for its enormous jaws, which are very long and hook-like, while the female—Fig. 47, *d* and Fig. 48—has short jaws. The flies hide themselves in obscure holes and corners during the day and become active as the shades of evening gather. They frequently fly into houses situated near running water, soon after dusk, attracted probably by the light.

The eggs of the Hellgramite Fly—Fig. 49—are oval, about the size of a radish seed, and of a pale colour, with some dark markings. They are usually deposited in patches, upon reeds or other aquatic plants overhanging the water, where, when hatched, the young larvæ may find ready access to that element which is destined to be its home until the end of the following spring.

BENEFICIAL INSECTS.

BY THE REV. C. J. S. BETHUNE, M. A.

Introductory (General Account of Insects).

- | | |
|--|---|
| 1. Tiger Beetles (<i>Cicindelidæ</i>). | 5. Scavenger Beetles (<i>Staphylinidæ</i>). |
| 2. Carnivorous Ground Beetles (<i>Carabidæ</i>). | 6. Dung Beetles (<i>Scarabæidæ &c.</i>) |
| 3. Water Beetles (<i>Dytiscidæ, Gyrimidæ &c.</i>). | 7. Luminous Insects (<i>Lampyridæ</i>). |
| 4. Carrion Beetles (<i>Silphidæ</i>). | 8. Lady Birds (<i>Coccinellidæ</i>). |

INTRODUCTORY.

Hitherto, in our Annual Reports, we have devoted ourselves to the consideration of those numerous species of insects that inflict damage upon our crops, fruits and vegetables, while we have only incidentally drawn attention to those other species that are useful to us as destroyers of their noxious fellows. We now propose to treat more especially of the latter class—our Insect Friends. We shall include amongst the number of these friends not merely those parasitic tribes whose special duty it is to keep in check the vegetable-feeding insects that would otherwise sweep everything away before them, but also those various other families that are directly useful to us from their products, or indirectly beneficial by acting as scavengers, removing nuisances, fertilizing plants, and performing other valuable offices. This is, indeed, a vast field of nature—one that we cannot traverse in a few pages or in a limited space of time; we must content ourselves, then, with taking one portion of it at a time and considering it somewhat in detail, in order to afford information that may be of use to the reader. Where to begin, and what mode of division to select, is not an easy matter to decide; we think, however, that it will tend to simplicity, if we follow the natural orders into which insects are distributed, taking one at a time and selecting for consideration those families or tribes which are especially serviceable in their different ways. We shall thus not be confined to one form of service fulfilled by insects, but be presented with a variety in turn, and at the same time we shall be able to touch slightly upon a few of the leading distinctions upon which classification is based.

In order to render our arrangement intelligible to the ordinary non-Entomological reader it is advisable that we should give a brief account of the principal structural differences upon which the classification into Orders depends. In the first place, then, an INSECT as the name implies (Latin:—*in* and *seco* I cut), is an animal whose body is divided into segments or rings, which are sometimes—as in wasps and hornets—almost entirely detached from each other, and cause the creature to appear as if cut in two. It thus belongs to that portion of the Animal Kingdom called the *Articulata*, the members of which have their bodies composed of short cylinders or annulations, jointed or articulated together. Insects may be distinguished from the *Articulata* by several characteristics. They breathe, for instance, not through their mouths, like the larger animals, nor yet through gills, like fish, but by means of spiracles or breathing holes in their sides, through which the air is drawn in and taken to all parts of the body. This mode of breathing distinguishes true insects from many kinds of animals.

that are sometimes included in the same class with them, such as crabs, lobsters, shrimps, etc., which breathe through gills, and spiders scorpions, etc., which have breathing sacs in the abdomen. The head of insects is distinct and more or less plainly separated from the rest of the body, thus differing again from crabs, scorpions and spiders. In their larval or grub state insects have, in many cases, a large number of legs, even as many as twenty-two in the caterpillars of some saw-flies, but in their perfect or winged state they never have more than six; this limitation separates them from spiders, which have eight; Centipedes which have from thirty to forty or more, and Millipedes or thousand-legged worms, which have in some species as many as two hundred. Another marked characteristic of insects is their wonderful system of metamorphoses or changes of state (for instance, from egg to caterpillar, caterpillar to chrysalis, and chrysalis to butterfly), ending, in the great majority of cases, in the acquisition of wings. A few other classes of animals undergo some metamorphoses,—in fact, if we include the embryo state, all do so,—but none of these attain to a winged form. Again, insects in their perfect or imago condition uniformly possess a pair of those very singular organs which we call feelers or *Antennæ* (from the Latin *Antenna*, the yard of a ship's mast), and which are not possessed by any of the numerous members of the spider family. Furthermore insects have their six legs, referred to above, very highly organized, with numerous joints and applications to fit them for all manner of purposes, and very different from the mere bristle like appendages of many worms.

To recapitulate, the distinguishing marks of an insect are briefly these:—1st. They have their bodies divided into *segments*; 2nd. They breathe through openings in their sides (*spiracles*) from which proceeds *tracheæ* or windpipes; 3rd. They have distinct heads, with jointed *antennæ*; 4th. When adult they have *six articulated legs*; 5th. They go through a number of metamorphoses, ending in a *winged state*.

These are the five grand characteristics of an insect proper; any members of the animal kingdom that do not possess them we exclude from the class, and omit from our consideration in these Reports. Many authors, we are aware, take a somewhat different view of the limits of the class of insects, and—regarding Spiders, Scorpions, Mites, Centipedes, Millipedes, etc., as degraded forms of insects—include them in their Entomological systems. As we all agree, however, pretty much in our definition of an insect proper, it becomes merely a question of technicalities rather than one of practical moment, whether we include or exclude these lower and closely allied forms. For the sake of simplicity and of greater ease in imparting information, we prefer to adhere to the limitations that we have laid down. Any of our readers who desire to look further into the matter—and we trust there may be many—we would refer to Dr. Packard's *Guide to the Study of Insects* as a convenient repository of information gathered from the works of all the leading authorities upon the subject.

In the higher orders of animals—to quote an account that we wrote some years ago,—* while the internal anatomy is wonderfully complicated, the outward appearance is comparatively simple and plain; all the works of the intricately constructed machine are concealed from view, a few primary organs only being apparent to the sight. In insects the case is just the reverse. The internal organs are few in number and simple in construction; while the external parts are particularly numerous, and marvellously varied to suit the special ends of the almost infinite number of differing species. To the student of Entomology this is a manifest advantage, as with the aid of a magnifier he is enabled to observe and note most of the various parts, or trace out their special uses, without having to resort to the dissection of the object. The great majority are on the surface, and if we give them a little careful examination and patient study we shall soon learn a great deal about them. The most obvious parts of an insect, when closely examined are: 1st: the *Head* and its appendages; 2nd: the *Thorax* to which are attached the wings and feet; and 3rd. the *Abdomen*, which is composed of several joints or segments and which is usually terminated by the organs of generation, or a sting or other instrument.

When we look at the head of a quadruped, we see that it is very small compared with the rest of the body, and that it exhibits only a pair of eyes and nostrils, a mouth, ears, and sometimes horns or tusks. A bird's head, again, displays still less, little more being seen than a pair of eyes and a beak. But take up an insect and examine its head with a lens, or, if it be a large specimen, even with the naked eye, and what a complicated structure do you

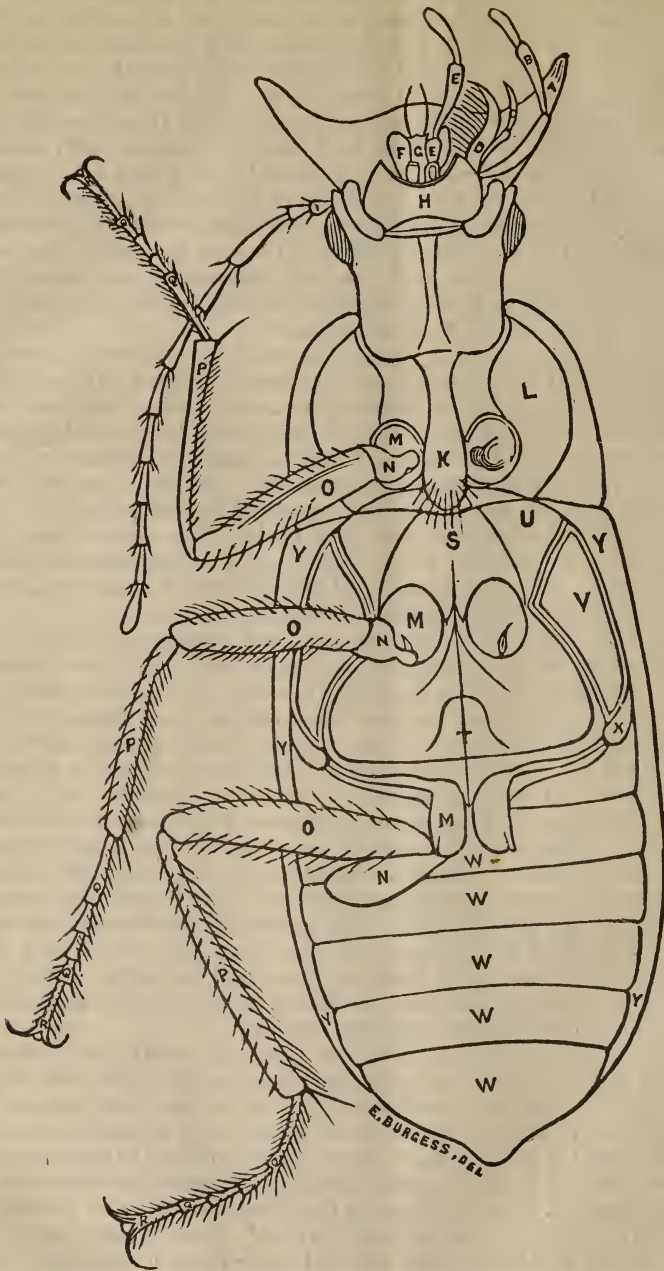
behold ! Eyes there are, big and little , antennæ or horns ; mouth with jaws above and jaws below, pairs of feelers or palpi, perhaps a sucker, or possibly a set of lancets ; instruments for observation, instruments of defence, instruments for taking food, all grouped together in a very small space, and constructed in the most wonderful variety of ways. Compare a few insects of different orders together, and the wonder is still greater. Look at the head of the large Pine-borer beetle, with its powerful jaws and antennæ twice the length of its body, then at the Dragon-fly with its scarcely perceptible antennæ, but with eyes that almost surround it ; look again at a large Hawk-moth, with its beautiful feather-like antennæ, and its coiled up sucker that will unr. ll to more than the length of its great body ; now turn to a grasshopper, a fly, or a bug and see what a change—what a variation of organs is to be seen ! To recount all these differences of form, structure, size, colour, clothing, etc., would occupy volumes, without even saying a word about their objects and offices. We must be content, then, with considering the organs as they are common to all, and only observe, for the present, the variations that distinguish the several grand orders of insects, leaving out of sight the minor differences that are peculiar to species, genera, or even families.

The *Head* of an insect—to come to particulars—is a hard, somewhat rounded skull ; having an opening in front for the mouth and its group of organs. On each side it has a fixed, immoveable eye, of large size and complex structure, between which are sometimes two, or often three, tiny little eyes, each consisting of a single lens. Close to the large eyes are two moveable jointed organs, called antennæ, of endless variety of form, size and structure, whose exact uses have long been a puzzle to naturalists. The front part of the head is often separated by a seam from the rest of the skull (especially in Beetles), and is then called the *Clypeus* or shield ; this part often bears a horn or knobs. The under surface of the head is called the throat, and is divided into various parts, each with its particular name, in the different orders of insects. The head is connected behind with the thorax, sometimes by a very slender neck, sometimes by a barely perceptible division.

The *organs of the mouth*, though varying very much in form, are yet constructed on one principle. They consist of six principal organs, two on each side of the opening, one above, and one below. The upper one is the upper lip (*labrum*) ; the lower the under lip : the upper pair of side organs are the upper jaws or *mandibles* ; the lower pair the *maxillæ* or lower jaws : Each of the lower jaws has attached to it one, or two, jointed organs or feelers, called *palpi*, and the under lip has also a pair of these feelers. The jaws, it should be noticed, move sideways, not up and down. There are two principal modes in which the food obtaining organs are employed, the operation of which is vastly different, and causes an enormous change in form and structure. When the side pieces of the mouth are short, apart from each other, and have a horizontal motion, the action produced is *biting*, as in a beetle ; but when these side pieces are elongated, pressed close to each other, and have a longitudinal motion, the action produced is *sucking*, as in a butterfly. According to these modes of action, insects are divided into two grand classes, called in English, *Biting Insects* and *Suctorial Insects* ; any classification based upon this difference, must, however, be confined to insects in their perfect form, since caterpillars, for instance, have jaws for biting, which are transformed into a spiral sucking-tube when the insect becomes a moth or butterfly.

In *Biting Insects* the upper lip is a flat plate closing the mouth above ; the upper pair of jaws or mandibles are of a hard, horny consistency, and are furnished with teeth for biting and gnawing the food ; these teeth are portions of the jaw itself, not separate in any way. The lower pair of jaws or maxillæ, are modified in many ways which it would be tedious to particularize here ; and the lower lip is still more complicated, and subject to great variations. In bees, the lower jaws and lip form together a sucking apparatus, while the form of the upper biting jaws causes them to be included among the biting insects. The accompanying large wood-cut, (Fig. 50) of a highly magnified beetle, exhibits all the various parts of the mouth of a biting insect, as well as the legs, abdomen and other parts of the under surface. The clearness of the illustration renders much description superfluous.

Fig. 50.



HARPALUS CALIGINOSUS, Say.

PARTS OF CUT.

Ventral Surface of *Harpalus Caliginosus*.

A Mandible.
 B Maxillary palpus.
 C Outer lobe of maxilla.
 D Inner lobe of maxilla.
 E Labial palpus.
 F Paraglossæ.

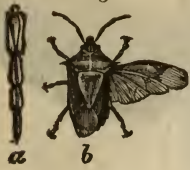
G Ligula.
 H Mentum.
 I Antenna.
 K Prosternum.
 L Episternum of prothorax.
 M Coxæ.

N Trochanter.
 O Femora.
 P Tibiæ.
 Q Tarsi.
 R Ungues.
 S Mesosternum.

T Metasternum.
 U Episternum of mesothorax.
 V Episternum of metathorax.
 W Ventral segments.
 X Epimeron of metathorax.
 Y Epipleura.

In *Suctorial Insects* there is a wonderful diversity of structure. Bugs, for instance, have the two pairs of side-pieces lengthened out into slender lancet-like organs for piercing, the whole being enclosed in the fleshy elongated lower lip, which acts as a sucker. (Fig. 51 *a*.) In Flies, also, the five

Fig. 51.



upper organs are turned into lancets sheathed in the fleshy sucker of the lower lip; this structure is especially seen in the fierce, blood-thirsty Horse-fly (*Tabanus*); in the common House-flies the lancets are wanting. In Butterflies and Moths the lower jaws are greatly elongated into a delicate instrument for sucking, which is coiled up and hidden from sight when the insect is at rest, but is thrust out and extended to the bottom of long-throated flowers when in action. (Fig. 52.) In all these cases the palpi, or mouth-feelers, also are variously modified. The

Fig. 52.



other organs of the mouth about which we need not now speak in particular are the antennæ, and the different kinds of eyes.

We have just now spoken of insects as being divided into two great sections according to

the structure of the mouth in the perfect insects, viz; *Suctorial* (*Haustellata*) and Biting (*Mandibulata*). These sections are further subdivided into seven Orders, depending upon the structure of the wings. We shall briefly recount the special characteristics of each Order, and then turn from what we fear are dry, even though necessary, details to the consideration of our proper subject—Beneficial Insects.

There is an immense difference of opinion among Naturalists with regard to the arrangement of these Orders, but as this is a question that does not concern us in these Reports we shall not enter into it, but merely content ourselves with following here the series adopted by Dr. Packard.

Order 1. HYMENOPTERA. (Greek: *Hymen* a membrane, and *Pteron* a wing). Includes Bees, Wasps, Sawflies, Ants, Ichneumons, etc. Four membranous wings, with few veins or nervules;

Fig. 53.



the hind pair usually the smaller. Fig. 53 represents a Saw-fly and its larva; Fig. 54 a magnified Ichneumon.

Fig. 54.



Order 2. LEPIDOPTERA. (Greek: *Lepis* a scale, and *Pteron* a wing). Includes Butterflies (Fig. 55.) and Moths. (Fig. 56.) Membranous wings, generally four, entirely covered with scales, antennæ almost always composed of numerous minute joints. Butterflies may be distinguished from moths by their club-shaped antennæ; the latter have these organs of very various forms, but never clubbed or thickened at the extremity. The larvæ are usually called caterpillars (Fig. 57),

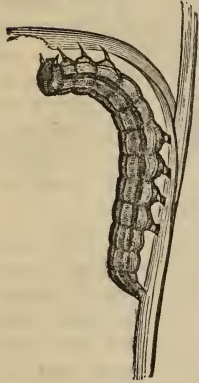
Fig. 55.



Fig. 56.



Fig. 57.



and are so familiar to every one that we need not enter into any description of them; they may be distinguished from the false caterpillars of Saw-flies by never having more than eight pairs of legs. The pupa is usually termed a chrysalis (Fig. 58), and sometimes is protected by a cocoon.

Fig. 58.



Fig. 59.



Fig. 60.



nished with jaws for biting.

Order 5. HEMIPTERA. (Greek: *Hemi* half, and *Pteron* a wing.) Includes Bugs, Plant lice, Boat flies, Cicadas, Cochineal Insects, &c., Four wings, the anterior pair of which are stiff and hard like those of the beetles, for about half their length, while the remainder is thin and membranous; the hinder pair are also membranous. The mouth is

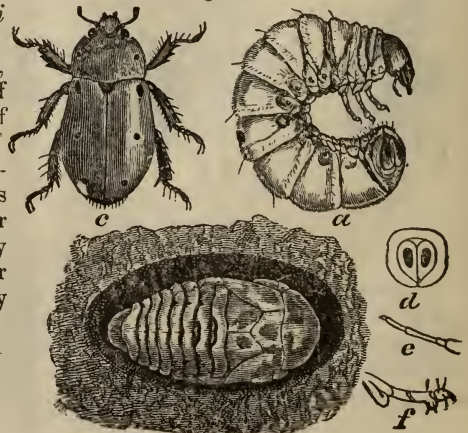
Fig. 62.



furnished with a sucker or beak, through which they imbibe the fluids, animal or vegetable, upon which they live. (figs. 62 and 63).

Order 4. COLEOPTERA. (Greek: *Coleos* a sheath, and *Pteron* a wing). Includes all the various tribes of beetles. Four wings usually present, the anterior pair of which are hardened and thickened so as to resemble the substance of the head and thorax, and are not adapted for flight, but form protecting cases (called *elytra*) for the ample hind wings, concealed beneath them. Fig. 61 represents a perfect beetle (*c*), the larva (*a*) and pupa (*b*). The mouth is always fur-

Fig. 61.



Order 6. ORTHOPTERA. (Greek: *Orthos* straight, and *Pteron* a wing.) Includes

Fig. 63.



Grasshoppers, Locusts, Crickets, Cockroaches, &c. Four wings, the anterior pair of which are somewhat thickened to protect the broad net-veined hinder pair, which fold up like a fan upon the abdomen, in long straight folds. The hind legs are large and thick, and adapted for leaping. Mouth furnished with strong jaws for biting and masticating.

Order 7. NEUROPTERA.

(Greek: *Neuron* a nerve, and *Pteron* a wing). Includes Dragon-flies (Fig. 64), May-flies, Caddis-flies, Termites, Lace-



winged flies, etc., Four thin, glassy wings, very finely reticulated, or covered with a fine network of veins or nerves. The mouth is usually furnished with biting jaws.

1. TIGER BEETLES (*Cicindelidae*).

Having now enumerated the various Orders into which Insects are divided, and their chief characteristics, it remains for us to select one for our consideration here, in respect to those of its members who may be deemed directly or indirectly beneficial to mankind. We have decided upon beginning with the Beetles (*Coleoptera*), partly because they are very favourite objects of study with Entomologists, and partly because they present strongly marked peculiarities both in structure and habits, and are very abundantly distributed everywhere. The first family of Beetles is the *Cicindelidae*, of which we have only one genus, *Cicindela*, in Canada. This name, derived from the Latin, signifies a Glow-worm or bright shining insect, and is applied to them on account of their bright metallic colours, which sparkle in the sunshine. In English they are commonly called Tiger-beetles from their fierce disposition and habit of leaping upon their prey. They feed entirely upon other insects, both in the larval or grub state, and when they attain to the winged or beetle condition. Their favourite haunts are warm sunny banks, sandy roads, railway tracks, or other spots exposed to the full glare of the sun, and free from vegetation, which would impede their movements. Some species, however, frequent grassy places on the borders of woods and among scattered trees. At the approach of the passer-by they suddenly take wing, and fly with great rapidity for a few yards before him, alighting again as suddenly as they rose, but always with their heads turned in the direction of the approaching danger. The same individual may be started up again and again, but after a few alarms, when he begins to find himself the object of a particular pursuit, he craftily eludes further persecution by making a long and circuitous flight back to his former station. By carefully marking where he goes, and going quietly back, we have often succeeded in finding the desired specimen careless and off his guard, and captured him even without the aid of a net. In cloudy or stormy weather they hide themselves in some convenient retreat, but they soon re-appear with the returning sunshine.

The eggs are laid in the earth, where the grubs that are hatched from them also spend their lives. These grubs or larvæ are very curious creatures, and well repay a little observation. It would be difficult to describe their form so as to render them easily recognizable to the reader, but the accompanying cut (Fig. 65.) will afford a sufficiently good idea of their appearance.



It will be seen that they have a pair of tremendous, curved jaws, three pairs of legs, and a pair of very curious recurved hooks or spines on the eighth segment towards the tail. They are of a yellowish white colour with a brownish horny head.

They live in deep round holes, about the diameter of a lead pencil, the orifice which they usually close with their heads. No sooner does any unsuspecting insect approach sufficiently near than it is seized by a sudden effort, and carried off to the bottom of the hole, there to be devoured at leisure. The larva lives in this manner throughout the summer, and

is supposed to pass through its pupa state in the ground during the winter, appearing in the beetle form early in the following spring.

The beetles, of which over one hundred different species are known to inhabit North America, and about a dozen have been found in Canada, are provided with sharp cutting jaws, three pairs of long slender legs, which enable them to run with great rapidity, and a pair of membranous wings, concealed beneath the handsome wing-covers when not in use. They feed upon small insects of every description, and must destroy incalculable numbers. The accom-

Fig. 66.



panying figures of some of our commonest species will enable the reader to recognize them without difficulty.

Fig. 66 represents the common Tiger-beetle (*Cicindela vulgaris*, Say), which is found in great numbers all over Canada and the United States. It is a little over half an inch long, and about half as broad, of a dull purplish colour above, and a bright brassy green beneath. On each wing cover above are three whitish lines of irregular shape, as seen in the figure. It is very common on roads and sandy banks throughout the summer.

Fig. 67 represents the purple Tiger-beetle (*C. purpurea*, Riv.), a very handsome metallic purple beetle, nearly the same size as the preceding, in company with which it is often found. Sometimes it is greenish instead of purple. This is one of the first beetles to come out in the spring. We have

Fig. 67



Fig. 68.



taken it in numbers in April, and once as early as the 17th of March, before the snow had all gone.

Fig. 68. The hairy-necked Tiger-beetle, (*C. hirticollis*, Say) is another common species that bears a general resemblance to *C. vulgaris* though smaller, and with the neck covered with whitish hair, as the name implies.

A most beautiful species is the Six-spotted Tiger-beetle, (*C. sex-guttata*, Fabr.), a most brilliant metallic green insect, with six tiny white spots on its wing-covers. It is sometimes found in gardens, but more usually in partially shaded places, where it chooses as its post of observation some projecting stone or log.

It is rather difficult to capture, being exceedingly active in its habits, and is not nearly so common as the preceding species.

Fig. 69 represents another very handsome and rather larger species which is occasionally found in Canada. As all these beetles live upon other insects, and devour enormous numbers of those that are injurious to us, we beg that our readers, one and all, will abstain from ruthlessly trampling them under foot in the future, and will rather encourage them about their farms and gardens.*

Fig. 69.

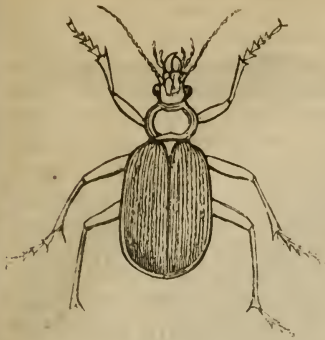


2. CARNIVOROUS GROUND BEETLES. (*Carabidae*).

Next of the Tiger-beetles comes the family of the Carnivorous Ground Beetles (*Carabidae*). Under this general name are included a very large number of different genera and species, which are found all over the world and in all sorts of situations. In Canada we have over forty genera and an immense variety of species already known to our Entomologists, and more are added to the list every year. Some of the species are the most difficult to determine of all our beetles, and afford an intricate puzzle to the student; the general features of the whole family can, however, be easily learnt from a few specimens, descriptions and illustrations of which we now proceed to place before the reader.

* To avoid misapprehension we would state that in this account of the Tiger Beetle, and in those that follow, we have quoted freely from our own contributions to the *Canada Farmer*. As our articles are scattered over a number of volumes and have not been published in consecutive form, we think no apology is needed for their partial reproduction here.

Fig. 70.



Colours, Metallic Green, Purple
and Copper.

Fig. 71.



by the spots just men-
tioned; still it is a handsome beetle, though not to be compared to the

Fig. 72.



Fig. 73.



The largest and handsomest member of the family is the green Caterpillar-hunter (*Calosoma scrutator*, Fab.—‘The Beautiful-bodied Searcher’). Fig. 70. It is of the same general shape as the following species, but no wood-cut can convey an idea of its exceeding beauty and brilliance of colour. The head and thorax are dark purplish black, the latter with a greenish coppery margin; the wing covers (elytra) are bright and shining green, with fine longitudinal lines and scattered punctures, and a broad, coppery red margin; the under-side is deep shining green varied with coppery markings: the legs are blackish-brown, in some lights deep purple. This magnificent beetle, as its name implies, feeds upon caterpillars, especially the obnoxious canker-worm of the United States; sometimes even ascending trees for the purpose; its larva (or grub) has also the same useful propensities. It is rather a rare insect in Canada, though found occasionally in most parts of Ontario;

collectors of insects can often find specimens in summer after a southerly gale, on the outer shore of Toronto Island, which is a famous place for obtaining rare beetles that have been drowned in the lake and washed ashore by the waves.

Another caterpillar-hunter, (Fig. 71), belonging to the same genus as the preceding, is quite a common insect in Canada, and can be found in May and June under logs or stones, as long as the ground is moist; in the hot dry weather it is not so readily met with. It is called the hot, or glowing *Calosoma* (*C. Calidum*, Fabr.) from the appearance of the wing-covers, which are black with six rows of bright coppery impressed spots, thus bearing a fanciful resemblance to a vessel of coals with a perforated cover. Its general colour is shining black, unrelieved except by the spots just mentioned; still it is a handsome beetle, though not to be compared to the breeding species. Like its congener, it devours caterpillars with avidity, both in its larval and perfect states, and is a capital hand at reducing the numbers of those horrid pests, the cut-worms; we usually transport a number of these big beetles into our garden every spring to keep down these cutters-off of our young cabbage plants.

The next large beetle of this family to which we would draw attention, is the murky ground beetle (*Harpalus Caliginosus*, Say); it is entirely of a dull black colour, and may be readily recognized from Fig.

72. We beg our readers to take particular notice of this figure, as there are a very large number of beetles of the same general shape and structure, though usually smaller, that prey upon other insects and are consequently useful to man. Any dark-brown, black, green or metallic coloured beetles of this shape, that are found under chips, or stones in damp places, or running in grass, may be safely considered as belonging to this family, and therefore be treated with kindness and consideration; it always gives us a pang of regret to find the crushed body of one of these beetles lying by the way side, where it has been ruthlessly trampled under foot by some ignorant “lord of creation.” The particular species here referred to is stated by Mr. Riley to be a formidable enemy of that western plague, the Colorado potato beetle; it is also satisfactory to learn that an allied species (*H. Pensylvanicus*, De Geer?) a very common insect in Canada, is a merciless devourer of the plum curculio. Fig. 73 represents the perfect insect, and Fig. 74 the larva.

A much smaller but very peculiar genus of beetles, is called the Bombardier (*Brachinus*), from its extraordinary power of discharging from its tail end a very pungent fluid, accompanied by a report (resembling the sound *phut*) and some smoke-like vapour; this fluid, which resembles nitric acid in its effects, and makes a stain

Fig. 74.



Fig. 75.



on the fingers that will last for several days, is no doubt intended for its defence against more powerful beetles. Fig. 75 represents one of these beetles (*B. fumans*, Linn.); its head, thorax, and legs are yellowish-red, and its wing-covers dark blue. Like other ground beetles, it may be found under sticks and stones in the spring, and in similar hiding-places on the damp margin of rivers during the hot summer months. There are quite a number of different species of this genus in Canada, but all are very much alike.

It would be almost an endless task to go through the list of species of this family, but we trust that the examples now given will be sufficient to enable our readers to recognize these friendly beetles, and save them from being doomed to a pitiless destruction, that knows no difference between friend and foe.

3. WATER BEETLES (*Dytiscidae*, *Gyrinidae* &c.)

After the carnivorous Ground Beetles, we come, in the ordinary classification of insects to a large group that live almost entirely in or upon the water. Some of them live on the surface of lakes, ponds and pools; others prefer clear running streams; others, again, the muddy bottoms of half-stagnant pools.

This group is divided into two principal families, the "diving-beetles" (*Dytiscidae*), and the "whirligigs" (*Gyrinidae*). They are all more or less insectivorous, both in their larval and perfect state, and hence beneficial. As their food, however, consists mainly of insects that inhabit the water, and which are either similar in their food and habits to their destroyers, or live upon water plants of no particular value, it can hardly be said that they are beneficial to the farmer or fruit-grower; still, as they are not noxious and are certainly useful in their own sphere, we shall go on to describe them, and implore that their lives may be spared from the destruction so universally dealt out to the poor insects.

The Diving-beetles (*Dytiscidae*) are mostly large-sized insects of an oval flattened shape, generally of a dark brown, olive, or blackish colour, and often with a margin and other markings of yellowish. Their legs are specially adapted for swimming, being large and oar-like, and covered with long hairs; the hinder pair are very much flattened, also, so as to give a propelling stroke. When they rise to the surface to take in a fresh supply of air—a silver-like bubble of which may generally be seen attached to their hinder extremities—they appear to come up merely from being specifically lighter than the water; but when they dive or swim through the liquid, which they do with great swiftness, they move by means of regular and successive strokes of their oar-like legs. When at rest upon the surface they extend these legs at right angles with the body, generally with the head under water and the tip of the abdomen above, enabling them to draw in air to the spiracles beneath the wing-covers. They inhabit stagnant pools in preference to running water, and are very voracious in their habits, attacking and devouring other denizens of the water, even occasionally preying upon very young fish. We have kept a specimen for many weeks in a glass jar of water, and watched its graceful movements and curious habits with much interest; it fed greedily upon house-flies, aphides, etc., with which we supplied it.

Their larvæ are called "water tigers" from their ferocity; they are long and cylindrical, with large flattened heads, armed with scissors-like jaws, by means of which they seize other insects, and, it is said, "snip off the tails of the tadpoles!" Their body terminates in a pair of long tubes through which they inhale the needful supply of air. When about to transform they creep into the earth near by, and make a round cell, inside of which they assume the pupa state, the perfect beetle appearing in two or three weeks, if in summer, but not till the following spring if in the autumn. We have sometimes seen little pools of water in the spring perfectly swarming with these and other larvæ.

The whirligigs (*Gyrinidæ*) must be familiar to every one. They are those little black beetles that one sees so often in groups on the surface of water, whirling and circling about in every direction with great rapidity. "When thus occupied their motions are so exceedingly quick that the eye is perplexed in following them, and dazzled by the brilliancy of their wing-cases, which glitter like bits of polished silver or burnished pearl. On approaching them they instantly take alarm and dive beneath the surface, carrying with them a little bubble of air, which glitters like a drop of quicksilver, and is attached to the posterior portion of their bodies. Sometimes they may be taken flying, their large wings enabling them to change their abode without difficulty, when the drying up of their native pool compels them to migrate. This enables us to account for the occasional discovery of these insects in small puddles of newly-fallen rain-water. The structure of the short hind legs, and especially of the curious branched tarsi, must be examined in endeavouring to account for the singular motions of these insects; the assembling together of which has been regarded by some writers as resulting purely from a strong social influence, and by others as indicating no closer bond than that of animals congregating round their common food. That the food of the *Gyrinidæ* consists of small dead floating insects, I have ascertained; but I would further suggest that, being produced on the same spot, as is the case with the swarms of midges, they are influenced in some degree by the common desire of continuing their species. I have often observed that, in their gyrations, they hit against one another. In dull and inclement weather they betake themselves to quiet places, under bridges, or beneath the roots of trees growing at the water's edge. When touched they emit a disagreeable odour, arising from a milky fluid, which is discharged from the pores of different parts of the body. The remarkable structure of the eyes, which, unlike those of most insects, consist of two distinct pairs, one on the upper and the other on the lower surface of the head, must be greatly serviceable to the insect in the peculiar situation in which it is generally observed, and whereby it is enabled to see objects beneath it in the water, and above it in the air." (Westwood). They are all of a broad, oval form, generally of polished black colour, with broad oar-like hind tarsi, and long slender fore-feet, used in seizing their prey. They vary in size from about one-fifth to half an inch in length.

Besides the Diving-beetles and the Whirligigs, there is yet another great family of aquatic beetles, which belong to a different sub-tribe of this order of insects; its members are termed "Water Lovers," (*Hydrophilidæ*) from their habits.

The members of this family live either in the water, or on the damp margins and shores of streams and ponds; they are carnivorous in the larval state, but as beetles they feed upon refuse and decaying vegetable matter, thus uniting the qualities of the two families already noticed, and those of the scavenger beetles, which we propose bringing before the reader by and by. A considerable number of these "Water Lovers" are found in Canada; some of the species attain a very large size, while others are quite minute, and not to be discerned without close observation. As these creatures are not of any very general interest, we may dismiss them from our notice and pass on to the more conspicuous and note-worthy Carrion Beetles.

4. BURYING AND CARRION BEETLES. (*Silphidæ*).

These curious and interesting creatures belong to the family *Silphidæ*; they are distinguished by the flattened form of their bodies, their knobbed antennæ, their habits, and the black nauseous fluid they discharge when handled. Their grand duty is to remove from the surface of the earth all dead or putrefying animal matter, which would otherwise become noxious and offensive. They are usually found in or close to carrion of all sorts, though sometimes they devour putrid fungus; occasionally we have taken them on the wing, and have even found them attracted by light into our rooms in summer. The *Silphidæ* are divided into several genera, the chief of which are *Necrophorus*, including the Sexton or Burying Beetles, and *Silpha*, the Carrion Beetles; both of these genera are well represented in Canada.

The Sexton Beetles (*Necrophorus*), in spite of their loathsome occupation, are decidedly handsome insects. Their usual colour is deep shining black, variegated with rich orange-red spots; beneath they are frequently ornamented with yellowish silken hair like that of a Humble-bee; their antennæ are very remarkable, consisting of a jointed stem terminated by a rose-coloured or orange knob composed of four little cups or plates piled

one above the other. The largest species we have is called the American Sexton (*N. Americanus*, Oliv.) ; it is nearly an inch and a half long, deep black, ornamented above with large orange-red spots on the head, thorax, and wing-covers, and beneath with light yellow hairs on the breast.

These insects are wonderfully powerful for their size, their flight is vigorous, and they are able to run with rapidity. We have at least ten species of these grave-digging beetles in Canada, differing from each other in size and ornamentation, but all possessing the same habits and instincts. They are not at all uncommon during the summer months ; no sooner, indeed, is any small dead animal or piece of flesh left in a decomposing state on the surface of the ground, than they assemble in troops to bury it. After a careful examination of the object, as if to take its dimensions, and ascertain how many labourers would be required for the job, several of them commence operations by creeping beneath the carcass and digging away the earth with their fore-legs ; they continue their labours till they succeed in sinking it several inches, sometimes nearly a foot, beneath the surface ; and at the end of twenty-four hours the object is generally out of sight, unless it be particularly large, or the ground difficult to work in. In this labour the males assist, and as soon as it is accomplished, the females deposit their eggs in the carcass.

Many curious and interesting accounts have been published respecting the habits and instincts of these creatures—two interesting narratives of the kind are given in the *Canada Farmer* for July 15th, 1868, page 214. A German Entomologist relates that he confined four beetles of this genus in a small space, and supplied them with the following quantity of materials : four frogs, three small birds, two fishes, one mole, two grasshoppers, the entrails of a fish, and two pieces of ox's liver ; they succeeded in interring the whole in fifty days. Of course this quantity was much more than sufficient for the nourishment of their future progeny, for whose benefit the burying takes place, and it was probably only because these carcasses were placed within their reach that they continued their burying propensities, (Westwood). As a further instance of their powers, we may mention the following case, related in the *American Entomologist* :—

“On one particular occasion, having deposited a full-grown rat upon newly-moved earth in a particular spot, as a trap for these Burying-Beetles, we found that in twelve hour's time the carcass had been completely buried, all but the tip of the tail, by a single individual of our largest and handsomest species, (*N. Americanus*, Oliv.) a beetle which is only one inch and a half long. It would puzzle an Irish labourer to bury a full-grown whale in the same length of time ; yet proportionately this would be a task of precisely the same magnitude.”

The Carrion Beetles (*Silpha*, etc.) differ from the foregoing in their more flattened shape, and dulness of colour, as well as in their habits and minor peculiarities of structure. Our largest and commonest species is the Surinam *Silpha* (*S. Surinamensis*, Fab.) Its colour is uniformly black, with a transverse irregular, reddish coloured band or series of spots, near the end of the wing-covers. It is found abundantly in carrion during the summer, and may certainly be considered from its fetid odour and repulsive appearance an exceedingly disgusting, even though highly useful creature. It does not bury its food, like the Sexton Beetle, but may be found swarming in and over exposed carcasses during the summer months, evidently revelling in filth. The handsomest species of this genus is the Shield-bearing *Silpha* (*S. peltata*, Catesby,) which is remarkable for the broad, thin expansion of its thorax in the form of an ancient semi-circular shield, of a creamy-white colour, ornamented in the middle with a device somewhat in the form of a cross. We have occasionally taken it in numbers about the body of a dead fish. The larvæ of this genus, unlike those of the preceding one, are obliged to seek their own food, which is of the same character as that of their parents, and consequently have strong legs, and a crustaceous flattened body.

5. SCAVENGER BEETLES (*Staphylinidae*).

The preceding group of insects follow the useful occupation of sextons for the smaller animals, or employ themselves in other ways for the removal of carrion. The next tribes of beetles that come within the scope of our present observation, discharge a somewhat similar office in the domain of nature, and busy themselves in the removal of nuisances from the surface of the earth.

To quote the words of Kirby and Spence (*Introduction*, Letter ix.),—"How disgusting to the eye, how offensive to the smell, would be the whole face of nature, were the vast quantity of excrement daily falling to the earth from the various animals which inhabit it, suffered to remain until gradually dissolved by the rain, or decomposed by the elements! That it does not thus offend us, we are indebted to an inconceivable host of insects which attack it the moment it falls; some immediately begin to devour it, others depositing in it eggs from which are soon hatched larvæ that concur in the same office with tenfold voracity; and thus every particle of dung, at least of the most offensive kinds, speedily swarms with inhabitants which consume all the liquid and noisome particles, leaving nothing but the undigested remains, that soon dry and are scattered by the winds, while the grass upon which it rested, no longer smothered by an impenetrable mass, springs up with increased vigour." The insects that engage in this work belong to many different tribes, chiefly pertaining to the orders of beetles and flies (*Diptera*). A large proportion of the former come in natural sequence almost immediately after the Carrion Beetles already described, and may, therefore, be fitly reviewed here. To give a complete account of all the different families of beetles that belong to the hordes of scavengers, would be a long, and—to the general reader—by no means an interesting proceeding; we shall, therefore, content ourselves with describing the peculiarities in structure and habits of the common sorts.

The first and most numerous family that we come to, includes all those species of beetles, called in England "Rove-beetles" or "Cock-tails" (*Staphylinidae*). They are readily distinguished from all the other families by their peculiarly long and narrow bodies, flattened form and very short wing-covers, (*elytra*) which only cover one or two segments of the abdomen, instead of almost the whole of it, as is the general rule with beetles. These short wing-covers give the insect somewhat the appearance of wearing a boy's short jacket, instead of a long coat; notwithstanding their brevity, however, they completely conceal and keep out of the way the ample membranous wings, which, when not in use for flight, are beautifully tucked away beneath them. The long uncovered abdomen is capable of being moved in different directions, and is employed by the creature in folding and unfolding its wings. When irritated or alarmed it cocks its tail over its back, and assumes a ludicrously threatening aspect: it also possesses the power, probably for defence, of protruding at will two vesicles from the extremity of the abdomen, which emit a very unpleasant, and sometimes indescribably fetid odour.

The chief food of these insects, both in the larval and perfect states, consists of decaying animal and vegetable matters; in early summer every piece of dung that falls to the earth speedily swarms with them, and in the autumn they are equally numerous in fungi, agarics, etc. Some species are also carnivorous, feeding upon other insects; in England a large species, commonly called the Devil's Coach Horse, (*Georiscus olens*) devours large numbers of the destructive Ear-wig (*Forficula*). "On the least approach of danger," Westwood relates, "this insect, like the rest of the group, immediately puts itself into a most ferocious-looking posture of defence, throwing the tail over the head like a scorpion, protruding the anal vesicles, elevating its head and widely opening its long and powerful jaws."

Upwards of four hundred species of this family of beetles are found in North America, and of these, one hundred and five species have been taken in Canada. Many more undoubtedly remain to be found and described when collectors pay more attention to the minuter forms of insect life. Eight hundred species have been described as found in England alone. In tropical climates they are very rare; their places as insect-scavengers being supplied by the excessively abundant ants and termites.

6. DUNG BEETLES (*Scarabæidae*, etc).

The members of the family to which we have now come, and to which we have given the title of "Dung-beetles," for want of a better, have been objects of peculiar interest to mankind for many thousand years, and will, no doubt, continue to attract the attention of all observers of nature as long as the world lasts. Were it not for their extraordinary habits and for the reverence which was accorded to some of them in ancient times, these creatures—like the preceding family—would be simply disgusting to us, even though of great value in the economy of nature.

Every one has, no doubt, heard of the Sacred Beetle of the Egyptians, which was worshipped by them as a god, and revered in various ways. It was called the *Scarabæus*, and belongs to the tribe we are now considering. "Hor-apollo"—according to Louis Figuier—"the learned commentator on Egyptian hieroglyphics, thinks that this people, in adopting the *Scarabæus* as a religious symbol, wished to represent at once *an unique birth—a father—the world—a man*. The *unique birth* means that the *Scarabæus* has no mother. A male wishing to procreate, said the Egyptians, takes the dung of an ox, works it up into a ball and gives it the shape of the world, rolls it with its hind legs from the east to the west, and places it in the ground, where it remains twenty-eight days. The twenty-ninth day it throws its ball, now open, into the water, and there comes forth a male *Scarabæus*. This explanation shows also why the *Scarabæus* was employed to represent at the same time *a father, a man and the world*. There were, however, according to the same author, three sorts of *Scarabæi*; one was in the shape of a cat, and threw out brightly shining rays (probably the Golden *Scarabæus*), the others had two horns (*Copris*)."

There is a colossal granite figure of a *Scarabæus* brought from Egypt in the British Museum, and other smaller representations that we have seen appear to have been worn as amulets, suspended from necklaces or bracelets. It is supposed by some that the plague of "flies" inflicted upon this people in the days of Moses consisted of swarms of this beetle, thus rendering the object of their superstitious worship a means of punishment; but we can hardly think that so innocent and harmless a creature, in other respects, would have been chosen by the Almighty for such a purpose; we do not, however, insist upon any particular view of the subject, as so little is told us in the pages of holy writ.

In Canada we have one species (*Canthon lævis*, Drury,) which bears a strong resemblance to the Egyptian *Scarabæus* in appearance and habits, it is not very common, but is, however, generally distributed throughout the Province of Ontario. There are also several species of another genus (*Copris*), which possess similar habits but differ in their striated wing-covers, and in the extraordinary curved horn with which the head of the males is armed. A remarkable peculiarity of these insects exists in the structure and situation of the hind legs, which are placed so near the extremity of the body and so far from each other, as to give the insect a most extraordinary appearance whilst walking. This peculiar formation is, however, particularly serviceable to its possessors in rolling the balls of excrementitious matter in which they enclose their eggs. These balls are at first irregular and soft, but by degrees, and by continued rolling, they become rounded and harder; they are propelled by means of the hind legs, and the insects occasionally mount on the top, when they find a difficulty in urging them along; probably in order to destroy the equilibrium. Sometimes these balls are an inch and a half in diameter; and in rolling them along the beetles stand almost upon their heads, with their heads turned away from the balls. These manoeuvres have for their object the burying of the balls in holes, which the insects have previously dug for their reception; and it is upon the dung thus deposited that the larvæ feed when hatched (MacLeay). These rhinoceros or unicorn beetles—as they may be termed—frequently fly into houses through open windows, when attracted by light in the warm summer evenings. They are especially abundant on sandy soils.

Another family of Dung-beetles (*Geotrupidæ*) performs a similar important part in the economy of nature, by feeding upon and burrowing under newly fallen dung. Its species, however, do not make up pellets and roll them along the ground, as those above mentioned, but content themselves with sinking shafts immediately under the mass of excrement, and there hoarding up the supply of food for their young. They are much more common in this country than the preceding, and may often be observed on a warm summer's evening, when the shadows are growing long, hovering about the droppings of some horse or cow, and preparing to do their part in the removal of a nuisance, and the fertilization of the earth.

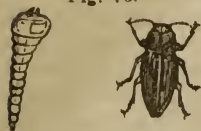
Yet another family (*Aphodiidæ*) must be briefly noticed, before we leave these useful creatures. One species is almost the first beetle to greet us in early spring, as it flies about the manure of the hot-bed, and expands its coral-red wing-covers to the sun. It is the *Aphonius fimetarius*, Linn., and is common in England as well as in Canada. Another tiny species (*A. inquinatus*, Fab.) swarms in the spring along the highways, resembling a fly as it hovers in the air, but easily distinguished when captured in the hand, or otherwise arrested in its flight; both of them feed upon horse-dung. The species of this family are especially numerous in the temperate regions of the northern hemisphere, and devote them

selves entirely to the consumption and removal of the excrement of the larger herbivorous animals. Need we say that they should, on no account, be destroyed?

7. LUMINOUS INSECTS (*Lampyridæ*).

In the regular order of families of beetles, according to the generally received classification of Coleoptera, we come to a number of decidedly noxious insects after the Dung-beetles just described; such for instance as the May-beetles and other leaf-eaters, (*Melolonthidæ*), the Buprestis Borers that perforate the wood of a majority of our trees, (Fig. 76), and the Spring-back Beetles, (*Elateridæ*), parents of the justly dreaded Wire-worms. The first family of common insects that we come to after these, are the Fire-flies—luminous insects of the family *Lampyridæ*.

Fig. 76.



In tropical countries the fire-flies belong to two very different families of beetles, the *Elateridæ* and the *Lampyridæ*, but in Canada luminous examples of the former are very rare indeed, though we have myriads of the latter. Our fire-flies, in the perfect state, are soft flattened beetles, with the head almost entirely concealed under the projecting hood formed by the thorax; they are generally of pale colours, though sometimes black. They are voracious in their habits; feeding in the larval state, upon earth-worms and soft-bodied insects. The light which they emit proceeds from the extremity of the abdomen, and appears, from its fitfulness, to be under the control of the insects. Its origin and composition have long been a matter of doubt. According to Siebold, "the luminous organs of these insects consist of a mass of spherical cells, filled with a fine granular substance, and surrounded by numerous trachean branches. This substance appears, by daylight, of a yellow, sulphur-like aspect. The light produced from these organs, so remarkably rich in tracheæ, is undoubtedly the result of a combustion kept up by the air of these vessels. This combustion explains the intermission of the phosphorescence observed with the brilliant fire-flies, and which coincides, not with the movements of the heart, but with those of inspiration and expiration."

All our readers are, no doubt, perfectly familiar with the sparkling intermittent light exhibited by fire flies on damp summer evenings. They appear to take especial delight in moisture, frequenting low marshy grounds and river bottoms in myriads, while they but occasionally visit the drier air of high ground. We have sometimes seen them in tens of thousands, nay millions, when driving at night along some sequestered country road bordered by wet, swampy ground, or when taking a nocturnal ramble in search of insects up the valley of the Credit. Brilliant and numerous though our Canadian fire-flies are, they cannot be compared—judging from the accounts of naturalists—with the glories of the tropical species. There, besides species similar to ours, they have the huge lantern flies, said to be two or three inches long, and emitting a most brilliant light and also the large spring-back beetle (*Elatér Noctilucus*) that gives forth a bright glow from spots on the thorax. Southey thus describes the appearance of these creatures in tropical America:—

"Soon did night display
More wonders than it veiled; innumerable tribes
From the wood cover swarm'd and darkness made
Their beauties visible; one while they stream'd
A bright blue radiance upon flowers that closed
Their gorgeous colours from the eye of day;
Now motionless and dark, eluded search,
Self-shrouded; and anon, starring the sky,
Rise like a shower of fire."

In England they have but one species of luminous insect, well known under the name of 'glow-worm.' The females of this insect are long, flat, soft wormlike creatures, quite destitute of wings; emitting usually a pale steady light from the extremity of the abdomen. The males, on the other hand possess complete wings and wing covers, and are but feebly luminous. We have taken them in early summer in the long damp grass beside hedge-rows in Lancashire, where their tiny light attracted us from some little distance. They did not, however, appear to be at all common.

In this country both sexes of the fire-flies are fully winged, and both appear to be equally luminous. The larvæ also of several species possess the property of emitting light; but of these we have rarely obtained specimens. In 1868 we obtained a remarkable larva

which in all probability belonged to the genus "*Melanactes*" of the *Elater* family. "Its general colour, (as we described at the time in the *Canadian Entomologist*, vol. 1. page 2) was a dark drab, the posterior angles of each segment, the softer connecting portion between the segments and the under side of the body being very much paler, and of a somewhat dirty yellow hue; on each side there is a deeply impressed line in which the spiracles are situated. When seen in the dark, the insect presented a very beautiful appearance, being apparently ringed and dotted with greenish fire. Each spiracle appeared to be a point of bright greenish light, and the division between each segment a line of the same colour; it looked indeed as if the whole insect were filled with fire, which shone out wherever it was not concealed by the dark shelly integument. When coiled up on its side it looked like a lovely Ammonite whose strizæ emitted green light, and with a point of green fire in each interspace."

All the insects of the *Lampyris* family, whether luminous or not, may be classed among our friends, as they do not feed upon our crops or fruits, but upon various worms, snails and insects. One species (*Chauliognathus Pennsylvanicus*), a pretty yellow soft-winged beetle, with a black oval spot towards the tip of each wing cover, is especially useful from its commendable habit of devouring the larvæ of the dreaded Plum Curculio, when in the larval state itself. The perfect insect we have sometimes taken in great numbers upon thistle blossoms, towards the close of summer.

8. LADY BIRDS (*Coccinellidæ*.)

From Luminous Insects to Lady-birds is a long leap to take in our description of neutral and beneficial insects. The intervening families of beetles, however, are so addicted to the destruction of our property in one form or another, and the exceptions are so few and inconspicuous, that we must pass them all over, and go on to the consideration of the pretty little creatures—as useful too, as they are pretty—that are generally known by the name of "Lady-birds," (vulgarly called *Lady-bugs*). They belong to the family *Coccinellidæ* of Coleoptera.

After the Luminous insects (*Lampyridæ*) which we just now brought before the reader, there come, according to the generally received classification, a large number of most destructive insects. Of these we may mention the *Ptinidæ*, the species of which "are found in old houses, in furniture, in rotten palings, stumps of trees, etc., which they and their larvæ perforate with round holes in every direction, which are filled with a very fine powder formed of gnawed wood and excrementa; some species feed upon collections of dried plants, skins of insects, etc; whilst others bore into our chairs, tables, and other woodwork, books, etc.; other species feed upon almost every substance, devouring ginger, rhubarb, cayenne pepper, etc.: and rendering ship-biscuit often unfit for use; others again feed upon woollen clothes, wheat in granaries, and other stores,"—a most noxious family certainly. After them come the *Scolytidæ*, the members of which are very destructive to trees and timber; the *Cantharidæ*, (Fig. 77,) useful for blistering purposes, as 'Spanish flies,' but very injurious to vegetation; the *Curculionidæ*, (Fig. 78,) one or two well-known species of which are enough to condemn the whole family, e. g. the Plum Curculio and the Pea-weevil; the *Cerambycidæ* or Capricorn Beetles, (Fig. 79,) the larvæ of which are wood-borers, and attack trees of every kind; and the *Chrysomelidæ*, beautiful golden insects many of them, but including such noxious creatures as the Three-lined potato beetle, (Fig. 80,) the Turnip-fly or Flea beetle, the Colorado Beetle, the newly imported Asparagus Beetle, etc,

Fig. 77.



Colour—Black and Yellow.

Fig. 78.



Fig. 79.



Fig. 80.



Colours,
Pale Yellow and Black.

The "Lady-birds" belong to the last family of all of the orders of beetles. They are so common and so well known to every child that it is hardly necessary to give any description of them. The accompanying wood-cuts will suffice to remind the reader of their appearance.

Fig. 81.



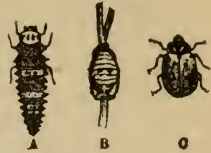
Fig. 82.



Fig. 83.



Fig. 84.



Who is there, indeed, that has not set one on outstretched finger and sung to it in childish glee, "Lady-bird, Lady-bird, fly away home, your house is on fire and your children all burned!"? In France they are much regarded also, and called by children "Bêtes à bon Dieu," "Vaches de la Vierge," etc.; and in England they are termed Lady-cows as well as Lady-birds.

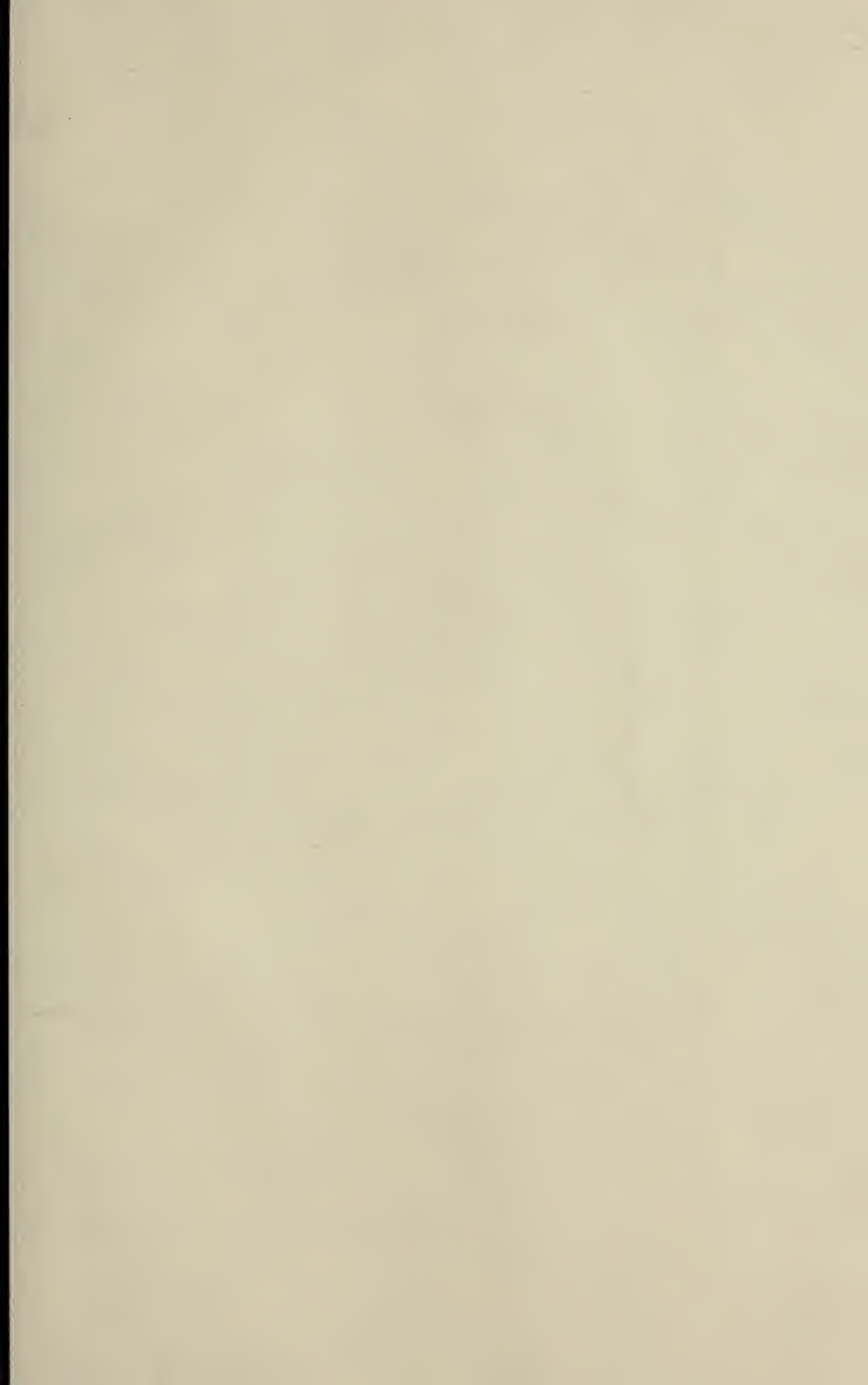
The general colours of these insects are yellow, red or orange, with black spots; and black, with red, white, or yellow spots; their shape is hemispherical, and though they vary somewhat in size, an average specimen bears a considerable resemblance in size and figure to an ordinary split pea; they have but very short legs and therefore creep but slowly; their powers of flight, however, are considerable. When alarmed they fold up their legs under the body and drop to the ground, and if handled they emit a yellowish fluid from the joints of the limbs which has rather a strong and disagreeable smell. In old times this fluid was considered to be an admirable specific for toothache! We have never, however, possessed sufficient courage to test its qualities in this respect ourselves!

As every one knows—or certainly ought to know by this time—the Lady-birds, both in their larval and perfect states, feed upon the obnoxious plant lice (*Aphides*), and are thus of the utmost service to the gardener, orchardist and hop-grower. Some species also prey very successfully upon the dreaded Colorado beetle, and assist beneficially in reducing the numbers of this new insect plague.*

More than thirty species of this family of beetles are known to inhabit Canada. Attention has so frequently been drawn to them in the course of these reports, that we need do no more than say—spare their lives and encourage their propagation by all means; they are the most useful class of insects that we have.

We have now enumerated all the leading varieties of beetles that are in their several modes serviceable to mankind. If any of our readers are now enabled to distinguish between insect friends or foes of this order, we shall feel well repaid for any trouble that these descriptions may have cost us. Our limited time and space preclude us from going on to other orders in this report; when another year comes round we hope, however, to have something further to say upon the subject.

* Vide *Second Annual Report*, p. 72.



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